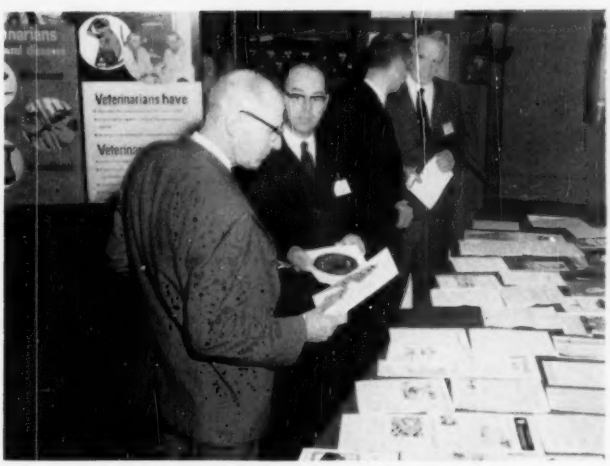
Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION



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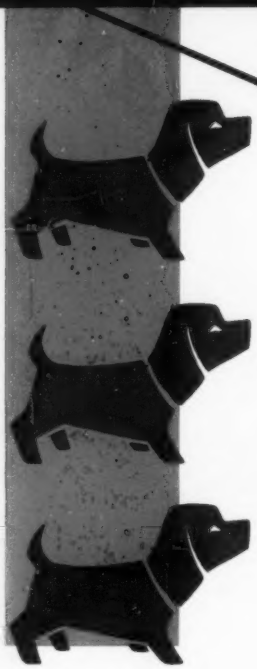

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Correspondence

October 19, 1959

Dear Sir:

I appreciated your recent editorial (see JOURNAL, April 1, 1959: 337) in which easily understood words were said to be superior to less common or more complex words. I was reminded of a scientific article written by one of my college classmates. It was so difficult to read that frequent reference to a dictionary was necessary. It seems to me that Author Juola attained a high level of gobblededook in the October 15 issue. Not only did whole sentences have an obscure meaning but the entire article was bunk.

s/R. M. BAILEY, D.V.M., B.A.
Lima, Ohio

[The article wasn't easy to read, but indications are that educators and others found the facts and data provided by Dr. Juola's report to be interesting and valuable.—ED.]

✦ ✦ ✦

Nov. 15, 1959

Dear Sir:

Have just read the article "Therapy of Experimentally Produced Bovine Cutaneous Papillomatosis with Vaccines and Excision" (JOURNAL, Sept. 15, 1959: 339). I was quite impressed with the detailed reporting and with the scientific methods employed by the authors. However, it was disappointing that without any supporting data or authentic references to literature they suggested that if warts are a herd problem consideration be given to a program of immunization of the calves with wart-tissue vaccine for prevention of the disease.

s/W. F. GUARD, D.V.M.
Circuit House
Bikaner, India

December 4, 1959

Dear Sir:

The question raised by Dr. Guard concerning prophylactic immunization of calves in a herd with warts is logical since all the reasons were not clearly presented.

The problem of such a herd was raised and the difficulties of therapy were examined by experimentation in the report. Prophylactic immunization was advised as a helpful measure because this had been tried by one of the authors. The incidence of warts was reduced in a herd in which more than half the young stock were affected. Calves of the herd were alternately vaccinated and left nonvaccinated when they were 1 to 2 weeks old. Of 72 vaccinated calves, warts developed in only 10 and were fewer, smaller, and of shorter duration than the warts which developed in 17 of the 71 nonvaccinated calves.

Why some of the vaccinated calves developed warts and why there was a decrease of incidence of warts in nonvaccinated calves are questions for further research. Variation in immunity to warts following vaccination has been reported previously (*Am. J. Vet. Res.*, 15, (April, 1954): 240; and *Proc. U. S. Livestock Assoc.* (1954): 219.

Sincerely,
s/CARL OLSON, D.V.M., Ph.D.
Madison, Wisconsin

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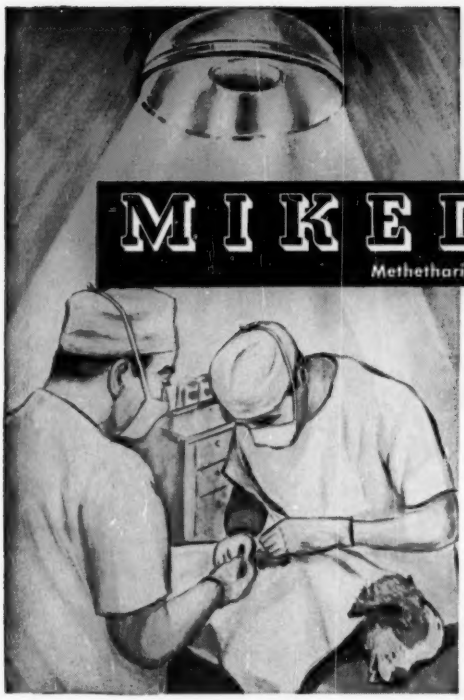

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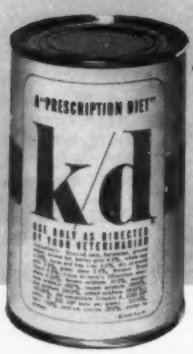

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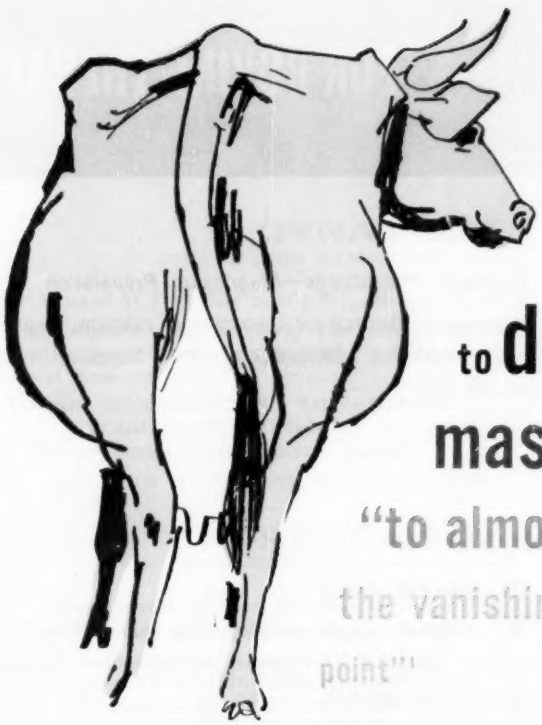

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1. Kakavas, J. C., et al.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951.

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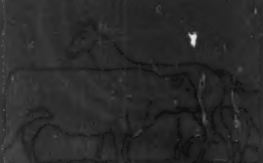

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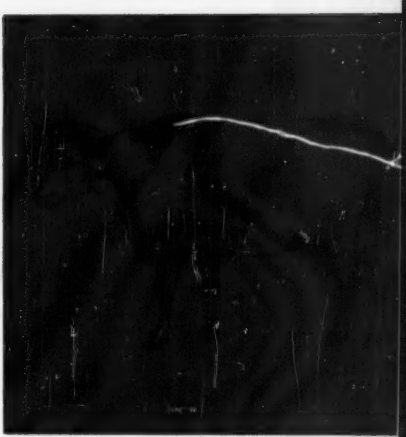

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*Willis, T. Ellsworth: Clinical Experiences with a New Glucocorticoid, *Veterinary Medicine* 54:489 (September) 1959.

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FROM THE AVMA WASHINGTON OFFICE

Iranian Agricultural Official Visits U. S.

Major General Abbas Izadpanah, Ministry of Agriculture, Iran [accompanied by Mr. Amir Behnam, Chief, Division of Sheep, Goats, Wool and Skins, Livestock Bongah (Department)], visited the United States, Oct. 8-Nov. 29, 1959, under ICA sponsorship in cooperation with USDA, and Land-Grant Colleges. The visit was to enable the General and Mr. Behnam to confer with leading agricultural officials and veterinary specialists to obtain information and ideas applicable to problems in Iran, particularly relating to cattle and sheep. Both leaders met unofficially with the chief of the Army Veterinary Corps, a representative of Air Force Veterinary Service, and the AVMA representative in Washington.

General Izadpanah, D.V.M., attended Toulouse Veterinary College and Toulouse Cavalry School. He is deputy of the Ministry of Agriculture (for livestock and veterinary) by order of the Shah, and also general inspector of the Iranian Army Veterinary Division including over-all administration of the Veterinary and Livestock Department. Other responsibilities include ministry representative in Dairy High Council; member High Committee Razi Institute, professor of veterinary surgery, Veterinary College Terhan University; and member of the National Committee (FAO) in Iran.

Criteria for Allocating Research Grants Reported

President Eisenhower has ordered advisory councils and study sections, PHS-HEW, to study more closely the applications for NIH medical research and training grants. According to the new criteria (1) projects must be of such high priority and promise that deferment of financial aid would be likely to delay medical progress, (2) support shall not result in harm to clinical and teaching services through diversion of manpower into research, (3) support shall not bring about substitution of federal for non-federal sources of assistance. These measures are for short term use, according to Department of Health, Education and Welfare. A comprehensive long range study is being developed.

FDA Lists 82 Chemicals Safe for Food

The FDA has listed, in the *Federal Register*, 82 chemicals found safe for use in foods. Six items in the proposed list of additives were not included on so-called "white list": carbon black, charcoal, titanium dioxide, ultramarine blue (food colorings), oleic acid, and linoleic acid. Their use in foods is not barred, but further study is needed before they can be labelled definitely safe, says the FDA.

(*Continued on adv. p.* 16)

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• • • That our success depends on products of merit, on understanding livestock disease problems and on improved service to veterinarians.

• • • That promotion of products for the control of livestock diseases should be confined exclusively to the veterinary profession.

• • • That your growing acceptance of our products indicates agreement with our maxim—"Produced for and sold to graduate veterinarians only."

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WASHINGTON NEWS—*Continued*

AEC Establishes Nuclear Safety Board

Atomic Energy Commission has established an Aerospace Nuclear Safety board consisting of 12 AEC staff members. The board will analyze the effects of nuclear space devices on public health, watch radiation from nuclear power sources on earth and in outer space, and recommend standards of safe practice for nuclear powered space devices.

Uniform Eartag Plan Is Widely Adopted

The USDA reports that the uniform eartag number plan for use in cooperative federal-state disease eradication programs has been adopted by 42 states in past four years. Two national herd-improvement associations are also using the plan in all 50 states. Subscribing states officially adopted the plan to help disease eradication programs by tracing animals to source herds. The eartag system is used by dairy herd improvement associations and artifical breeding organizations in conjunction with individual records, movement, health status, breeding activities, etc.

Meat Inspection Service Report

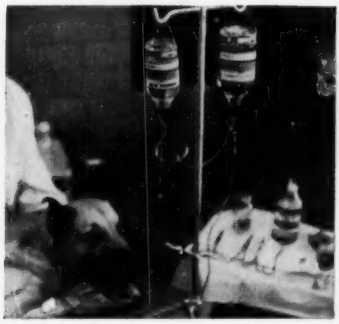
Nearly 100 million meat carcasses were judged fit for human consumption by Meat Inspection Service, ARS, USDA, during the fiscal year of 1959. Inspections were conducted in 1,334 establishments (529 slaughterhouses and 805 meat processing plants), located in 546 cities. A free copy of "Summary of Activities—Meat Inspection Division, 1959", may be obtained from the Press Service, Office of Information, U.S. Department of Agriculture, Washington 25, D.C. Colonel Marion W. Scothorn, V.C., has been assigned commandant of the Meat and Dairy Hygiene School, Chicago, Ill.

Information on Importing Pets

Included in PHS new edition "Immunization Information for International Travel," is information on importation and reentry of pets. The pocket-sized guide may be purchased for 30 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Drs. Gordon, Hadlow, and Stamp Join Scrapie Meetings

Dr. W. S. Gordon, director, Agricultural Research Council Station, Compton, England, Dr. J. T. Stamp, director, Moredun Institute, Edinburgh, Scotland, Dr. W. D. Hadlow, USDA, ADPR Div. Neuropathologist, who is working with Dr. Gordon, are in the U.S. for a series of scrapie research meetings sponsored and arranged by ARS, USDA. Following the first meeting in Washington, D.C., Nov. 23, they began an extensive national tour accompanied by Drs. J. L. Hourrigan, ADE Div., ARS, and M. S. Shahan, director, Plum Island Animal Disease Laboratory.



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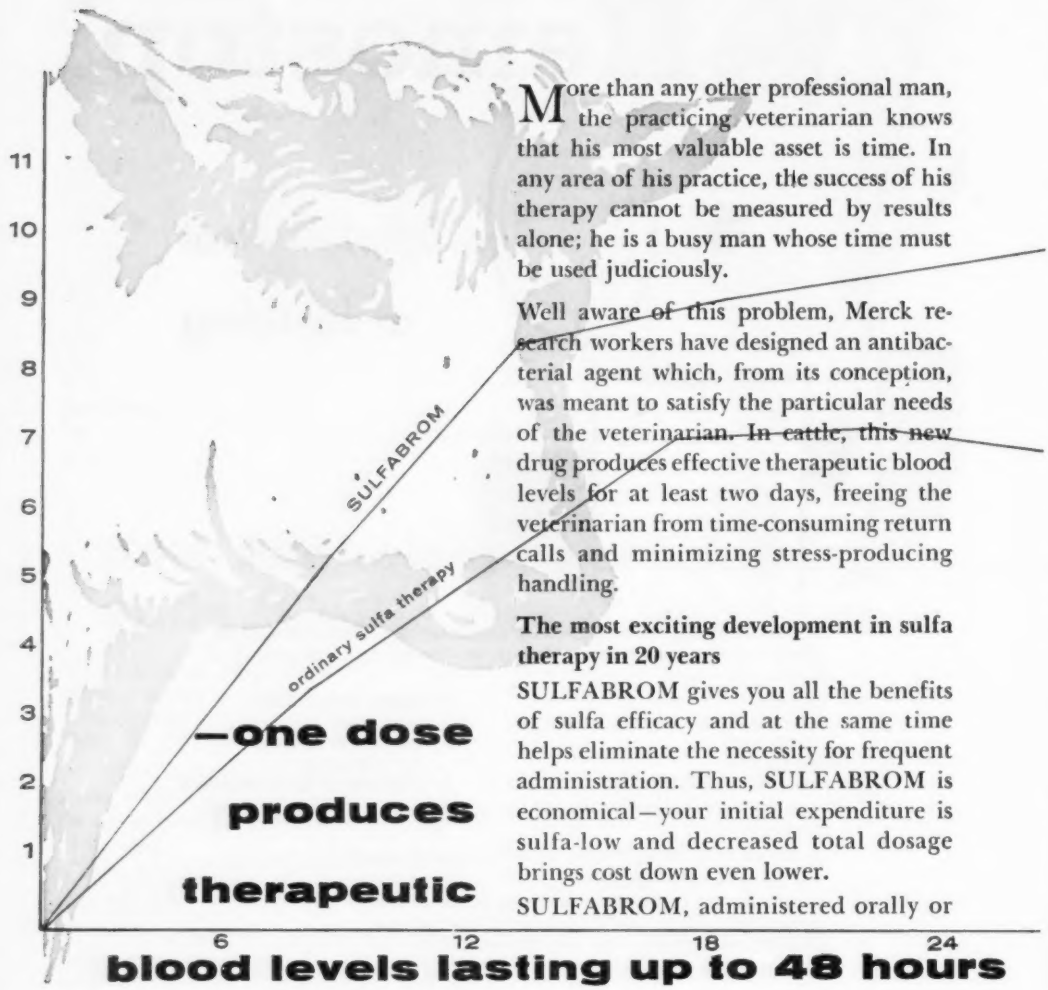

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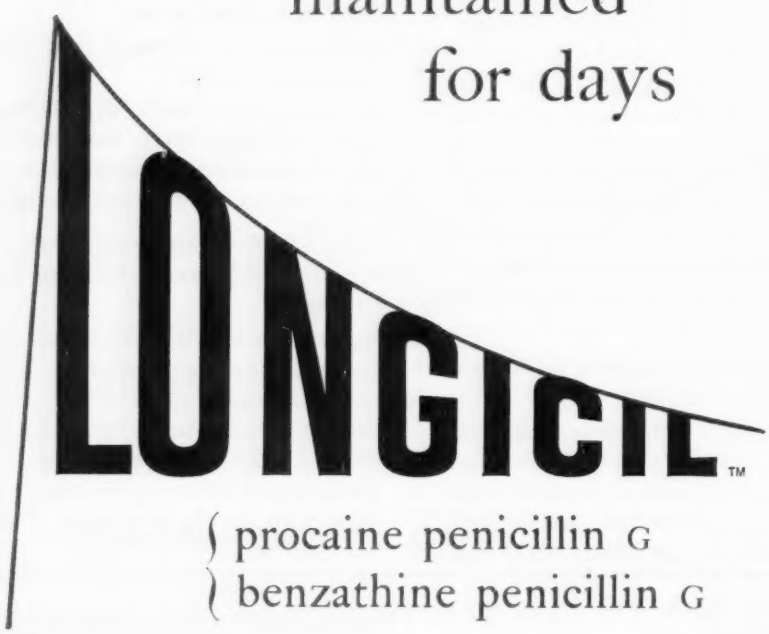

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Contributions of Tissue Culture to

Canine Hepatitis and Distemper

Vaccination

V. J. CABASSO, SC.D.

INFECTIOUS CANINE HEPATITIS

PROPAGATION of infectious canine hepatitis (ICH) virus in dog kidney tissue culture was first reported from our laboratory,[4] and soon confirmed by other investigators.[7,10] Prior to that time, experimental work with this virus had to be carried out on live pups, which was slow, laborious, and often unrewarding because of the readiness with which these animals contracted natural ICH infection. A procedure as simple as a virus titration sometimes presented insurmountable problems because of difficulty in securing adequate numbers of susceptible animals and maintaining them in strict isolation. Similarly, a practical determination of serum antibodies was only possible by the complement-fixation method, which frequently gives negative results for otherwise immune animals. Finally, only an inactivated vaccine could be prepared by infecting susceptible animals, obtaining their tissues at the height of the disease, and making them into a rather crude tissue suspension.

Adaptation of ICH Virus to Tissue Culture

Propagation of ICH virus in tissue culture resulted not only in virus-rich, almost tissue-free preparations, but its readily observed destructive action on tissue enabled quick detection of the presence of virus.

Normal cells in dog kidney cultures grow contiguously in a monolayer sheet which adheres to the test tube wall (fig. 1). This culture is obtained in six to seven days, in the presence of an appropriate nutrient medium, from either tiny fragments of dog kidney tissue or from a suspension of kidney cells freed from each other by the action of trypsin. Such a culture is ready to support the growth of ICH virus. Disintegrating action of the virus on the culture, known as cytopathogenic effect (fig. 2), becomes evident within 48 hours after introduction of virus into the test tube and is

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The author thanks Drs. A. R. Wagner for the histologic examination of all specimens; Dr. H. Simpson for coordinating field efforts; the many veterinarians who made the field trials possible; and Mrs. E. Manoogian for assistance in preparing the manuscript.

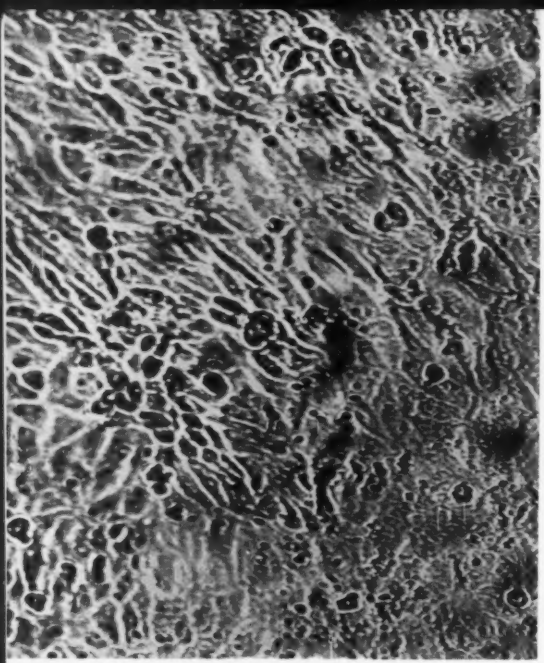
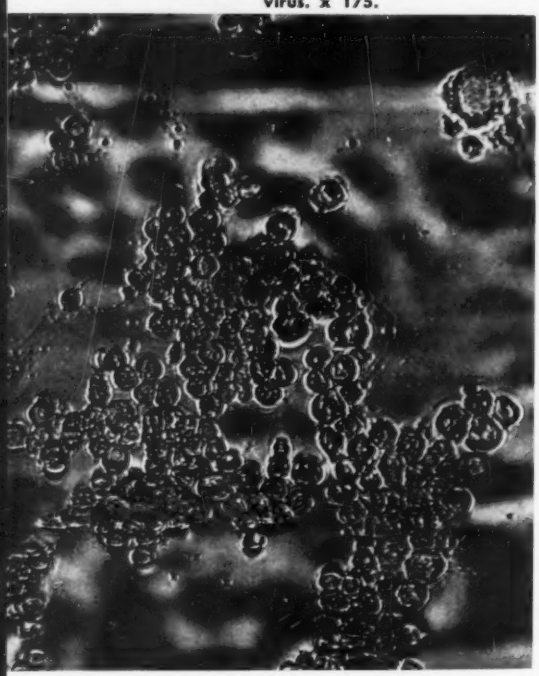


Fig. 1—Epithelial growth of dog kidney tissue not infected with ICH virus. x 175.

Fig. 2—Dog kidney tissue culture showing cytopathogenic effect following infection with ICH virus. x 175.



complete in three to four days, depending on the amount of virus inoculated. The cells are no longer polygonal or contiguous, but are rounded and separated from each other and soon become detached from the glass. At this time, the virus population has increased over one-hundred fold and accumulates in the clear medium which bathed the culture all along.

Occurrence of cytopathogenic effect has made it possible to determine virus content of an infected tissue or suspension rapidly and with great accuracy. It is also used for the measurement of ICH antibodies by serum-neutralization method in dog kidney tissue culture. As is well known, neutralizing antibodies constitute the most reliable information pertaining to the immune status of an animal.

Another recent noteworthy contribution of the tissue-culture technique has been the separation of individual ICH virus particles by the plaquing-out method[9] (fig. 3). When a dilute suspension of virus is uniformly spread in a Petri dish over a fully grown, dog kidney cell monolayer and immobilized under a thin layer of nutrient fluid containing agar, individual viruses will grow at a distance from each other. When the progeny of each particle has reached proportions sufficient to destroy several contiguous cells, a small circular hole appears to have been "punched out" at the point of first contact. This can be made to stand out more sharply by the use of a vital dye which is not taken up by those cells killed by the virus. This recent technique can be extremely helpful in giving exact counts of viable virus particles, as is required in highly quantitative experiments. It may also be possible to segregate avirulent virus clones from field strains of virulent virus, thus obviating the necessity of prolonged passages in an unnatural host, such as swine kidney cultures, in order to modify the virus for the dog.

Although it bears no connection to the problem of the disease in dogs, another outcome of the cultivation of ICH virus in tissue culture is worthy of mention. The cytopathogenic effect of the virus in dog kidney cultures and its specific neutralization by homologous antiserum has afforded a reliable method of ruling out any etiologic relationship between the disease of the dog and infectious hepatitis of man.[2] This was accomplished by demonstrating in dog kid-

ney tissue culture that serums of hepatitis-convalescent persons did not neutralize ICH virus.

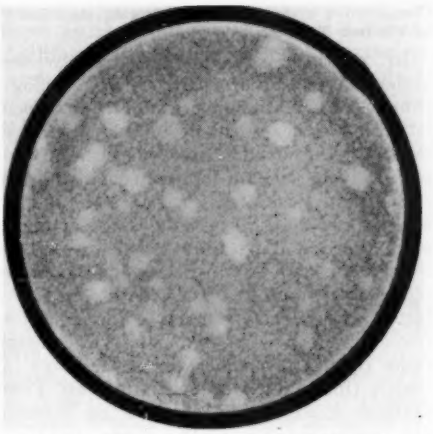


Fig. 3—Plaque formation with ICH virus.

Development of Modified, Live ICH Virus Vaccine

Propagation of ICH virus in tissue culture has resulted in an effective and safe live-virus vaccine. First evidence of modification of this virus for dogs was obtained in tissue culture following its continuous passage in dog kidney cells.[5,7] Susceptible pups, inoculated with cultured virus at different passage levels, up to and including the 30th, all developed typical ICH, and some died from the infection. However, those which received the 50th or 52nd passages remained normal and developed antibodies. These findings gave rise to the hope that a live-virus vaccine was imminent, until it was observed that pups which were placed as cage contacts to those injected with the 52nd passage virus came down with mild but definite ICH signs after 17 to 19 days of contact.

The indication that a single passage of the modified virus in pups might cause return of its virulence led us to attempt its further modification in tissues of an unnatural host. This has been accomplished by repeated passage of the dog kidney-propagated virus in cultures of embryonic swine kidney tissue. Evidence was soon obtained in the laboratory that the virus became safe not only for the recipient animal but also for its intimate cage contacts. Inoculated animals developed neither fever nor leukopenia. The only adverse reaction was a light, transient opacity of one eye in an occasional animal. This reaction was more aesthetically objectionable than serious, since it was always of a mild nature, did not affect the general disposition of the animal, and cleared up completely in four to five days without any special care.

Virus was found to be present for a limited time in the urine of some vaccinated dogs, but no carrier state was established. Virus quantities excreted were very small, and none was recovered before 18 days or after 27 days following inoculation. Contact animals were not affected, and spread of the immunizing agent could be detected only through serologic tests or challenge.

The degree of attenuation of this virus was unequivocally demonstrated by various laboratory experiments.

Intraocular Inoculation of Swine Kidney-Grown ICH Virus

As has been reported earlier,[5] 4 susceptible pups were given 1,000,000 tissue-culture, 50 per cent-infective, doses of fifteenth passage swine kidney-cultured virus in the anterior chamber of one eye. This route of inoculation is known to be the most sensitive for ICH infection and terminates fatally in most pups inoculated with virulent ICH virus. Progress of infection in the 4 pups was followed by temperature readings and leukocyte counts and was compared with that in pups previously inoculated by the same route with street ICH virus (fig. 4). Beginning three to four days after inoculation, injected corneas of the 4 pups became cloudy. A complete unilateral opacity developed subsequently and persisted throughout the experiment. However, both temperatures and leukocyte counts were within normal limits, appetites remained normal, and all animals appeared to be in perfectly good health. Abnormal temperatures and leukocyte findings characterized 2 pups with typical ICH elicited by intraocular administration of virulent ICH virus; 1 died and the other recovered.

Comparative Histopathology Following Modified or Virulent ICH Virus

In another experiment, a study was undertaken to compare histopathologic changes which take place following inoculation of either virulent or swine kidney-modified ICH virus. Three susceptible pups were given 0.1 ml. of sixteenth passage swine kidney-adapted virus into the anterior chamber of the eye. Their 2 litter mates were inoculated by the same route with a 2 per cent suspension of dog liver infected with virulent ICH virus. Whereas the 2 latter pups developed acute ICH and died five days after inoculation, the 3 vaccinated pups remained normal for seven days, at which time they were euthanatized. Postmortem examination revealed no remarkable gross changes in the vaccinated pups, but typical ICH pathology was observed in the unvaccinated ones. Liver, kidney, and spleen tissues from the 5 pups were fixed in 10 per cent formalin and examined histopathologically.

The 2 pups which were given virulent virus presented extensive areas of focal necrosis in the liver and lacunose dilation of the sinusoids. Parenchymal degeneration, congestion, and hemorrhage were also present. Numerous intranuclear inclusions, with a distinct halo and peripheral margination of chromatin were observed. Inclusions were more numerous in and around areas adjacent to necrotic tissue. Kidneys showed extensive degeneration of tubular epithelium and edema. Intranuclear inclusions with peripheral margination of chromatin were present in endothelial cells of the glomerular tufts. Inclusions were not observed in all glomeruli and their number never exceeded one or two for each glomerulus. Intranuclear inclusions were also seen in the reticuloendothelial cells of the spleen.

In contrast, livers of vaccinated pups revealed only a generalized but mild degeneration, probably due to exsanguination. There was also some mild epithelial de-

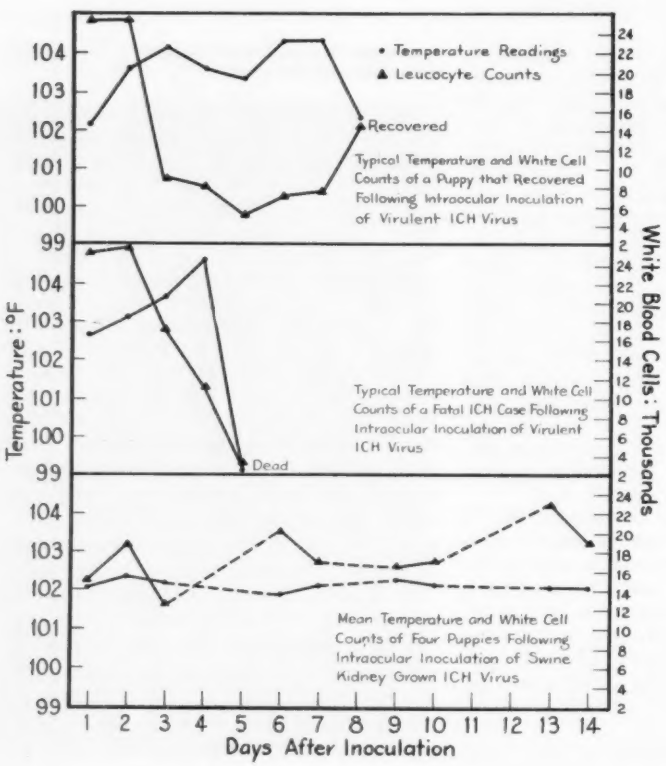

• Temperature Readings
▲ Leucocyte Counts
Recovered
Typical Temperature and White Cell Counts of a Puppy that Recovered Following Intraocular Inoculation of Virulent ICH Virus
Dead
Typical Temperature and White Cell Counts of a Fatal ICH Case Following Intraocular Inoculation of Virulent ICH Virus
Mean Temperature and White Cell Counts of Four Puppies Following Intraocular Inoculation of Swine Kidney Grown ICH Virus
Temperature: °F
White Blood Cells: Thousands
Days After Inoculation

Fig. 4—Graph showing the comparative response of pups to intraocular inoculations of virulent and swine kidney-grown ICH virus as measured by temperature and leukocyte count.

generation and desquamation of the kidney tubules. The spleen appeared normal with no inclusions, and there were none in the liver or kidneys.

Back-Passage of Modified ICH Virus in Susceptible Pups

A third experiment was specifically designed to determine whether back-passage of modifield virus would bring about reversion to virulence. Three antibody-free pups were given 0.1 ml. of tissue culture fluid of sixteenth passage swine kidney-cultured virus in the anterior chamber of the eye. Except for corneal opacity, the pups remained normal for seven days, at which time they were euthanatized. A pool of their liver, spleen, and kidney tissues was made into a 20 per cent suspension which was centrifuged at 2,000 r.p.m. for ten minutes and inoculated intraperitoneally into 4 susceptible pups at the rate of 5.0 ml. each. These pups also remained normal for seven days. At this time, 2 pups were euthanatized and the remaining 2 were retained alive for serologic studies. Tissues of euthanatized pups were prepared, and a third passage was made in a litter of pups. Again no abnormal reactions were observed and, at the end of seven days, 2 of the pups were euthanatized and the others retained for serologic testing. Fourth, fifth, and sixth passages were made under identical conditions in litters of 3, 4, and 4 pups respectively, euthanatizing 2 animals at each transfer. As with previous passages, no adverse reactions occurred. Pups which were kept alive remained normal for the entire observation period. Blood samples were taken at weekly intervals following their inoculation, and their serums were tested for ICH-neutralizing antibodies.

It is concluded that, under the conditions of this experiment, tissues of pups vaccinated with swine kidney-modified ICH virus can be successively transferred for six passages in susceptible animals without causing any signs of illness. Temperature readings and leukocyte counts were normal at all times. That the virus was carried through at least four passages was indicated by the fact that pups which were not euthanatized developed neutralizing antibodies by the third week following tissue inoculation. However, for an unexplained reason, the virus seems to have been lost between the fourth and fifth passages, because no antibodies were formed following the fifth and sixth transfers. Nevertheless, these results indicate that swine kidney-modified ICH virus will not regain any apparent virulence through at least four back-passages in susceptible pups and probably for six.

CANINE DISTEMPER

Whereas tissue culture has been very helpful in solving many problems connected with ICH virus, its contributions to canine distemper (CD) are still limited because of its more recent advent in this area. Despite repeated efforts on the part of many investigators, distemper virus only a short time ago was successfully cultivated in tissue culture. As is often the case in biologic research, it was reported almost simultaneously from three widely separated areas of the world. In Sweden, it was reported that distemper virus, derived from 2 dogs with cases of naturally acquired disease, had been grown in dog kidney tissue culture. The virus caused a characteristic cytopathogenic effect which could be specifically inhibited by anti-canine distemper serum. Thus, a convenient tissue culture-neutralization test became available which, in addition to its use in distemper studies, may prove valuable in contributing to the solution of a question raised recently of a possible relationship between distemper and human measles.[1] Similar results were reported from Great Britain[12] where distemper virus strains of ferret and dog origin were successfully grown in canine lung and kidney, as well as in ferret kidney cultures, causing a distinct cytopathologic reaction.

In our own laboratory, we were able to propagate a strain of distemper virus in chicken embryo tissue culture.[6] This virus strain was carried in tissue culture through 64 serial passages. Multiplication of the virus, however, was not accompanied by cytopathologic reactions, precluding the use of this method of virus cultivation as a laboratory assay. However, titers attained, as measured on the chorioallantoic membrane of the live chicken embryo, were of the same order as those reported for *in ovo*-propagated virus with considerably less tissue contaminants being present. Ef-

fective experimental freeze-dried vaccines were prepared with different passage levels of this virus.

A problem which remains to be solved before a distemper tissue culture virus vaccine becomes generally available is one of shelf stability. Titers of tissue culture freeze-dried preparation seem to decline more rapidly than those of egg-propagated virus which may be due to relative freedom from protective tissue proteins.

COMBINED DISTEMPER-HEPATITIS VACCINE

Availability of modified variants of both distemper and hepatitis viruses has logically led to combination into a bivalent vaccine.[3,5] In the product developed in our laboratory, the CD component consists of a culture of virus in live chicken embryos pending adequate stabilization of tissue culture-propagated virus. The ICH component, however, is a culture of modified virus in embryonic swine kidney tissue.

Ample evidence has been obtained which shows the efficacy of bivalent vaccine by simultaneous immunization of doubly susceptible animals.[5] A question which required clarification was whether a "crowding out" effect from one antibody upon another could take place in practice. In other words, would an animal already possessing antibodies to hepatitis be still capable of responding fully to the CD stimulus, or would the animal's rapid anamnestic response to ICH hamper the formation of CD antibodies?

Response of ICH-Immune Pups to CD Component of Bivalent Virus

Five susceptible pups were immunized against ICH with modified, live, monovalent ICH vaccine followed by challenge with virulent ICH virus. Subsequently, 3 animals were given, subcutaneously, a single 2.0-cc. injection of combined vaccine, and the 2 others were left uninoculated to serve as cage-contact controls. All 5 pups remained normal throughout the 48-day observation period. Blood specimens were obtained on the day of bivalent-vaccine administration and again on the 46th day. The pups were tested by the serum-neutralization method using dog kidney tissue culture for ICH antibodies, and chicken embryos for CD antibodies. On the 48th day, the 5 pups were challenged intravenously with Snyder Hill distemper virus, a particularly virulent strain.[8] It was clearly demonstrated that previous presence of ICH antibodies did not interfere with the response to the CD component of the bivalent vaccine, since the 3 vaccinated pups developed substantial levels of neutralizing antibodies and survived challenge with no ill effect.

This experiment also indicates that distemper vaccine virus does not spread from vaccinated to pups susceptible on intimate contact. These latter pups remained antibody-free despite 46 days of contact and died of distemper following challenge.

CD and ICH Virus Content of Consecutive Lots of Bivalent Vaccine

Another paramount question with regard to any live-virus vaccine is whether routine large-scale production lots contain the quantity of virus required for stimulation of adequate immunity. This is particularly important for a bivalent vaccine in which both components must be present in effective amounts. For CD and ICH modified viruses, these amounts have been shown by investigators in this field to be as follows: a minimum of 64 to 250 chicken embryo 50 per cent-infective doses for CD,[3] and between six and 63 tissue culture 50 per cent-infective doses for ICH.[5,3] In every instance on several routine production vaccine lots, both viruses were present in excess of the minimum, ranging in seven lots from six to ten times the required amount for CD, and from 1,000 to 20,000 times that needed for ICH.

Summary of Field Clinical Trials with Combined CD-ICH Virus

In addition to the record in the laboratory, it is essential that the performance of a new vaccine be tested under field conditions. Testing of bivalent vaccine was carried out in cooperation with several veterinarians. In all, 510 pups, 6 weeks to 6 months old and representing 24 different breeds, were vaccinated with a uniform 2.0-cc. dose of vaccine. Only eight clinical

reactions were reported, and seven of these were of a mild nature with prompt return to normal. There were 6 cases of corneal opacity, 1 of anorexia, and 1 of convulsion. Corneal opacities were either unilateral or bilateral, and in all cases cleared up in four to 14 days with no residual abnormalities. Two of these cases were atypical for ICH and could have been caused by ocular injuries. Anorexia in a 6-week-old Pomeranian lasted for three to four days after vaccination.

The case in which neurologic signs occurred had an unusual history. A smooth-haired female Terrier pup, 3 months of age, was treated for fractured and luxated elbow under pentobarbitol sodium anesthesia just before receiving the 2.0-cc. dose of bivalent vaccine. There were no reactions to vaccination, and the pup seemed well for nine days. At that time, it was found to have a temperature of 104.8 F. and was treated with antibiotics and antiserum. The following day, it was released since it appeared normal, but it was returned to the hospital two hours later in convulsions. These were not controlled by anesthesia, and the animal was euthanatized the following morning. No post-mortem examination was performed. It is obvious that this pup had been traumatized just before vaccination and was a poor experimental subject from the start. The convulsions may have been totally unrelated to the vaccine.

In the field-vaccinated animals, there were several bitches in the final stages of pregnancy and others nursing newborn pups. No adverse reactions were noticed in either mothers or their offspring.

Immunologic response to vaccination was also favorable. Serum neutralization tests on a sample of 58 vaccinated pups revealed that 94.8 per cent had responded to CD vaccination and nearly 100 per cent to ICH.

SUMMARY AND CONCLUSIONS

Propagation of infectious canine hepatitis (ICH) virus in tissue culture has offered an improved tool for study and control of this acute disease of the dog. The typical cytopathogenic effect which accompanies virus multiplication has provided a convenient *in vitro* method for the accurate determination of virus titers and for the measurement of serum antibodies. Most important, however, has been the ultimate modification of the virus for dogs by serial passage in dog kidney cultures followed by several transfers in embryonic swine tissue. The modified virus was found safe by the intraocular route, caused no histopathologic changes, and did not revert to virulence following at least six back-passages in susceptible animals.

Despite repeated attempts, growth of canine distemper (CD) virus in tissue culture has been successful only recently. Virulent strains were propagated in dog tissues, causing characteristic lesions, and a modified virus was cultivated in chicken embryo tissues, yielding a practically tissue-free preparation. These latest developments will help improve laboratory diagnostic procedures and vaccine production with this virus.

Availability of modified variants of CD and ICH viruses made it possible to combine these agents in a safe and effective bivalent vaccine.

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Antigenic Relationship Between Viruses

Canine Distemper and Measles

The Epidemiologic Significance of

J. W. SKAGGS, D.V.M., M.P.H.

IN 1945, a possible relationship between canine distemper and measles viruses was suggested. Subsequent studies[1-5,8,9,12,14,15,-17,19] have substantiated this hypothesis by demonstrating similar clinical and histopathologic manifestations as well as establishing that the viruses are closely related antigenically. This paper is a review of the current status of this relationship, and its possible epidemiologic significance.

Basis for an Established Relationship

Clinical Considerations.—Clinically, canine distemper and measles infections are comparable in many respects. The incubation period for each disease is relatively long. The clinical syndrome seen in canine distemper is characterized by fever, coryza, cough, and conjunctivitis.[13] A demyelinating encephalitis characterized by chorea is a common complication. Symptoms of measles also include these clinical signs and occasionally a complicating encephalomyelitis.[18] In addition, measles is characterized by a maculopapular rash. Such rashes have been described in dogs with distemper but are inconsistently observed.

Recovery from either disease results in long-lasting immunity and reinfections seldom, if ever, occur. Both infections are rare in early life due to passively acquired antibodies from the usually immune mother.

Histopathologic Studies.—In 1945, similar histopathologic changes in pulmonary tissues from fatal canine distemper in mink, ferrets, and foxes, and from measles in man were observed.[17] Giant cell interstitial pneumonias were common to all. Cytoplasmic and intranuclear inclusion bodies were identical.

In several studies of interstitial pneumonias in children, microscopic lesions identical to those of canine distemper were discovered.[1,3,4] Clinical

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measles was diagnosed in most of these cases. In addition to the characteristic giant cell and inclusion body formation previously mentioned, Warthin-Finkeldey cells were also found in animals with canine distemper.[4] These large giant cells with cytoplasmic inclusion bodies are commonly found in the tonsillar and pharyngeal mucosae of measles patients and were previously considered to be pathognomonic for that disease.

Histopathologic lesions were so strikingly comparable that early investigators concluded that measles and canine distemper were caused by closely related or perhaps identical viruses.

Serologic Studies.—In 1953, a substance in human blood capable of neutralizing canine distemper virus in chicken embryos and ferrets was demonstrated.[1] Commercial *gamma* globulin also contained a canine distemper virus-neutralizing substance. In a continuation of this study, the neutralizing ability of some human serums was occasionally equal to or in excess of that found in serums of distemper-immune ferrets.[12]

In 1955, the neutralizing substance from human blood was found to possess attributes of true antibody.[14] A prevalence study of this canine distemper virus antibody in a group of 293 human subjects showed that the age distribution curve was typical of the expected immune response to a common viral infection (fig. 1). Antibodies were present in the blood of all infants tested. The prevalence rate decreased steadily to zero in the 8- to 12-month age group, and rose gradually thereafter. All samples from persons over 10 years old contained demonstrable antibody. This curve suggested a persistent antibody response possibly resulting from continued contact with the antigen during adulthood.

In 1956, the neutralizing antibody was demonstrated, using suckling mice as the host animal, and its appearance in human serums was correlated with the occurrence of measles infection.[8,9] Measles was frequently mentioned in retrospective medical histories of patients in whom canine distemper-neutralizing antibodies had been demonstrated. Of 38 persons with a known history of measles, 37 had canine distemper antibodies. In contrast, these antibodies were found in only 13 of 78 persons having no history of measles. During the Stockholm measles epidemic in March, 1957, it was determined that distemper-neutralizing antibodies first appeared in the blood of human patients from three to seven days after onset of clinical signs. A fourfold rise in blood titer occurred between acute and convalescent stages of disease in 11 of 14 patients.

Numerous immunological cross reactions between canine distemper virus, measles virus, and their respective antiserums have been described.[1,3,4,12] Measles and distemper antiserums protected 100 per cent of suckling mice from the lethal effects of canine distemper virus inoculation. Serum from 1 measles-immunized ferret protected mice when challenged with over 3,000 $l.d._{50}$ of distemper virus. Rises in canine distemper virus-neutralizing antibody titers were observed in convalescent serum from measles patients in mouse, ferret, and chicken embryo-protection studies. Measles virus cytopathogenesis in HeLa-cell cultures was neutralized by both measles and distemper antiserums. The addition of complement enhanced the neutralizing properties of the serums. These serum-neutralization studies clearly showed that common antigenic components are shared by canine distemper and measles viruses.

Cross-Infectivity Studies.—Protection studies revealed that ferrets inoculated with measles virus subsequently had a prolonged incubation period and an altered clinical response when challenged with canine distemper virus.[4]

A recent report described clinical symptoms in 48 dogs infected with measles virus.[10] There was a viremia for two to eight days following inoculation. Fever was observed in 50 per cent of the animals and 28 per cent showed coryza and rash. The virus was isolated and passed to a second group of pups where it produced similar effects. These findings have not been substantiated by other investigators, nor has canine distemper virus been shown to be infective for man.

Epidemiologic Implications of this Relationship

Reservoirs of Infection.—The viruses of canine distemper and measles are world-wide in distribution.[33,38] The characteristic periodic epidemics of both diseases are generally explained by changes in resistance levels of exposed populations. This explanation of the incidence of measles has been questioned, but no other plausible explanation has been advanced.[31] To date, there is no evidence that dogs act as reservoirs for measles virus, although it is theoretically possible. Also it is possible that man might serve as a reservoir for canine distemper virus.

Implications in Control.—Both viruses are transmitted via the respiratory route.[33,38] Nasopharyngeal secretions from the infected hosts disseminate the viruses into the air, and it is possible for a single case to effectively expose a large group of individuals, particularly within closed spaces such as school rooms or kennels.

An effective vaccine for dogs is produced by growing distemper virus in embryonating eggs.[7] Although a measles vaccine of similar origin has been developed, subsequent field trials were disappointingly unsuccessful.[16] Recent advances in tissue culture techniques provide another means of cultivation of measles virus and some investigators feel that an attenuated virus vaccine from this source will be forthcoming.[19]

These viruses are closely related antigenically and, therefore, one might assume that a vaccine which is protective for one disease will be protective for the other. A single account of the use of chicken embryo-attenuated canine distemper vaccine in a human population has been published.[5] Analysis of measles attack rates during an epidemic in the test population three years following the vaccinations

revealed a statistically significant difference between the vaccinated group and controls.

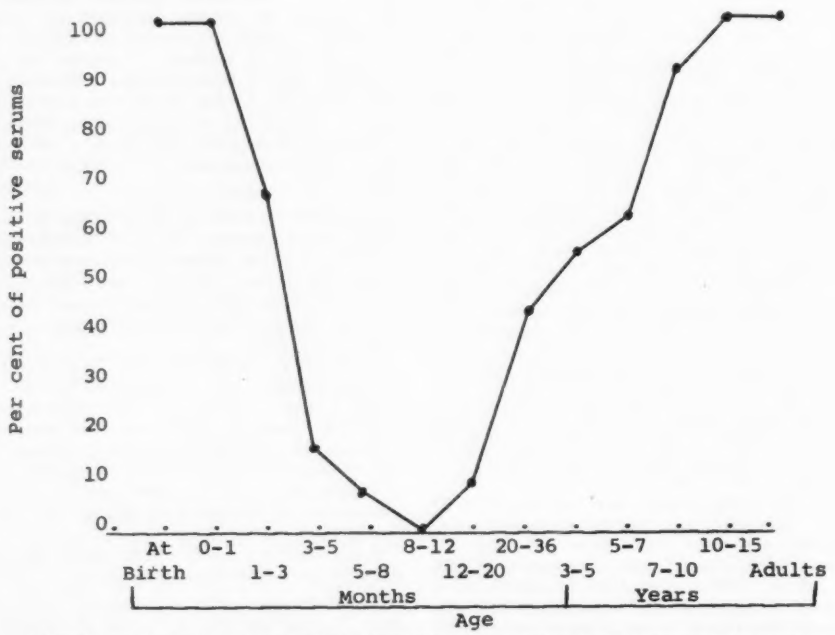
Ecological and Evolutionary Considerations.—In order to perpetuate themselves, pathogenic organisms are dependent upon adaptation to an abundant and gregarious host species.[8] Primitive man was neither abundant nor gregarious, and it has been theorized that the agents of most human epidemic diseases were derived from other animal species. It is generally accepted that microorganisms are capable of such adaptational changes. In this regard it has been concluded that:

> "Heritable variations in bacteria and viruses arise by a process of discontinuous mutation similar to gene mutation in the higher forms and that the mass transformation of a strain as observed in practice is the result of selective survival and overgrowth of one or more mutant types."[8]

By projecting this line of reasoning to the problem at hand, one can hypothesize that canine distemper and measles viruses probably had common ancestry and evolved as closely related, though distinct, entities by a process of discontinuous mutation. The present range of host susceptibility would seem to be the only contrasting factor between these two viruses. Even this is possibly open to question in view of the previously cited account of induced measles infections in dogs.[10] Nevertheless, the differences between the two viruses must be relatively minute, and, perhaps, occasionally the two viruses may be interchangeable as the result of cyclic mutation or host adaption.

Recommendations for Further Study.—Certainly further studies are indicated to clarify the significance of the relationship between these two viruses. Continuation of serological and cultural studies will further clarify the antigenic relationship. The suckling mouse is now recognized as an excellent host for *in vivo* studies since it is susceptible to both viruses. Tissue culture cell lines provide another avenue of approach.

Field studies on the distribution and occurrence of both diseases should be instituted to answer the following questions: Is there an area of endemicity for either disease in which the other does not occur? What is the frequency of simultaneous occurrence of both diseases in small isolated groups? Is there evidence that measles



[1]Adapted from Karzon, D. T.: Studies On a Neutralizing Antibody against Canine Distemper Virus Found In Man. Pediatrics, 16, (1955): 815.

Fig. 1 — Relative frequency distribution of canine distemper virus-neutralizing antibody in 293 human serums by age groups.[1]

virus is transmitted naturally to dogs, and do these animals suffer the typical distemper syndrome? Is canine distemper virus infective for man and, if so, does it result in clinical signs typical of those expected from measles infection? Is chicken embryo-attenuated distemper vaccine an effective and practical immunizing agent against human measles?

Carefully controlled laboratory and field investigations are needed to give a more adequate understanding of the relationship between these two viruses.

Summary

Canine distemper and measles virus infections produce similar clinical syndromes and histopathologic changes in their respective hosts. The usual symptoms include fever, rash, coryza, cough and, occasionally, encephalitis. Histopathologically, identical giant cell and inclusion body formations are found in the pulmonary and pharyngeal tissues. Laboratory studies have established that these two viruses share identical antigenic components and stimulate closely related antibodies. One investigator has demonstrated that measles virus is capable of infecting dogs and results in the typical clinical syndrome of distemper. There are no observations that canine distemper virus will infect man. Some evidence indicates that chicken embryo-attenuated canine distemper vaccine is an effective immunizing agent against human measles.

Further laboratory and field investigations are necessary to clarify the epidemiologic significance of the relationship between the two viruses.

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Brucellosis costs swine producers 10 cents a hog which amounts to about $10 million per year to all hog raisers combined.—*Nat. Hog Farmer (Oct., 1959): 19.*

Changes and Challenges in Veterinary Medicine

The increased trend for upgrading educational requirements, standards, and curriculum that began in 1919 will, indeed, continue. Still, we must be vigilant. We must make periodic re-evaluations of our courses to improve the quality of our education and to insure our progress. In addition, we must consider trends and changes for preparing young people for veterinary service. There will be increases in the size of livestock-raising operations, integrated or contract farming, new demands and obligations in public health work, irradiation hazards which may affect livestock populations and food products, and a larger number of pets needing care and attention.

Dr. S. F. Scheidy, president of the AVMA, presented this address at the 75th anniversary of the founding of the School of Veterinary Medicine at the University of Pennsylvania, and the 77th annual convention of the Pennsylvania State V.M.A., Oct. 1-3, 1959.

There will be intensified research effort in the prevention of disease in animals and man. This same trend will develop in radiobiology and in specialization within specific areas of popular veterinary services—such as animal nutrition, infertility or subfertility of farm animals—which will enrich the mainstream of the medical and biological sciences.

Beyond this, there will be a greater demand for wholesome and nutritious foodstuffs to meet the demands made by an increased population. The U.S. Census Bureau estimates that in 25 years we will have a population of approximately 275 million—50 per cent more people than we now have—and that in 50 years our population will total 370 million.

The veterinary profession has, indeed, come far. Dr. Joseph Arburua, in an article entitled "History of Veterinary Medicine in the United States" (*J.A.V.M.A.*, July, 1934: 10) cites R. L. Allen as giving a description of the many so-called "veterinarians" who evidently were abundant prior to and in the nineteenth century. He calls them "depraved, drunken and disreputable horse traders, anvil artists and livery stable parasites whose principal qualifications were greed and dishonesty." I'm sure that in the distinguished audience I'm addressing, none would answer to that description. Nor do I imagine that we could be fairly called "unscrupulous mountebanks whose chief stock-in-trade was a glib tongue and their asserted ability to cure 'hollow horn,' 'wolf in the trail,' 'loss of cud,' and 'moon eyes.' "

The same article gives a list of remedies in those days to treat what was known as "Hoven, or Swelling of the Paunch." Here are a few of them: "An egg shell full of tar forced down the throat. A wine glassful of gunpowder mixed with cold lard and forced into the stomach. A pint of strong lye solution. A pint of gin poured down the throat." Well, indeed, that last remedy may have anticipated the use of the popular tranquilizers of today.

When we consider what veterinary medicine is like today, we may conclude that in 100 or so calendar years we have advanced by as many light years. And so we have. But it is always easy to poke fun at the past. We are all blessed with 20-20 hindsight. Let's not forget that we still have a long way to go.

Sometimes it seems that the greater our progress has been, the greater our problems become. Ours is an age of science and technology, and the frontiers of the mind have replaced the frontiers of geography. The years ahead will see even greater scientific and technological advances; advances in which veterinary medicine should play an important part.

To meet the challenge ahead of us, we must devote much attention to the biological sciences. We must also delve more deeply into the basic structure—the cell—and we must determine what influences it, such as light, heat, nutritional needs, enzymes; and what will alter it and its behavior to cause mutations, growths, and multiplications, in order to understand how to prevent and to control disease. The challenge ahead of us, though foreseeable, is not measurable.

Contentment with things as they are was never a characteristic of great men. We

can not borrow the vision bestowed upon men like Benjamin Rush, but we can profitably borrow their quality of divine discontent. No matter how great our schools become, no matter how "flourishing" its condition, I hope we will always feel that we are "not yet satisfied with its prosperity and fame." It is on maintaining this attitude that our progress depends.

Public Relations at the Hospital

By taking advantage of the short-acting anesthetics and the injectable tranquilizers, it should be possible to avoid handling any pet in a manner that might be considered unduly rough by the client. If a hospital acquires a reputation for roughness in the handling of pets, it is most difficult to overcome.

✦ ✦ ✦

Petty quarrels among hospital personnel must be settled quickly; otherwise the feeling of unrest will affect the confidence of the clientele. If complete and satisfactory settlements cannot be made, the employment of the participants should be terminated, for those persons who cannot get along with fellow workers are not likely to be able to please the clients.

✦ ✦ ✦

Trimming toenails of hospitalized dogs is much appreciated by discriminating owners, who should be told that this was needed but was done without charge. At the same time, any problem anticipated in the near future (such as dental work, ear cleaning, anal glands, or small tumors) should be called to his attention in such a manner that he doesn't get the impression that an attempt is being made to sell unneeded services.

✦ ✦ ✦

If bills are concisely and clearly itemized in detail, it should be possible to avoid haggling. Not only are properly identified bills seldom questioned, but many times the client is surprised that the total is not greater than shown.

✦ ✦ ✦

Even though the patient has been released and the account paid, take some time late each morning to make inquiry by phone to see how he is doing. This proves your interest in the client and his pet. It not only provides an opportunity to give advice on further care but may provide amicable resolution of any criticism the client may have failed to mention previously.

✦ ✦ ✦

Issue both a tag and a certificate for each rabies vaccination given and keep a permanent and orderly record of same. The pets that carry your tag on their collars are in effect advertising your hospital, and clients appreciate that the tag would be helpful in getting a lost dog back to its home.

✦ ✦ ✦

If a pet dies while in the hospital, use every possible means to notify the owner immediately. If he is out of town and cannot be reached promptly, send a telegram to be forwarded. Avoid being forced to give an owner this bad news when he calls for his pet at the hospital.—*John Micuda, D.V.M., Phoenix, Ariz., at the Texas V.M.A. meeting, Oct., 1959.*

New Penicillin Discovery Announced

The basic molecule of penicillin—6-amino-penicillanic acid—was isolated recently by research workers at Beecham Research Laboratories at Brockham Park, England. It was stated that this finding may lead to the most important break-through in the penicillin field since the discovery of penicillin's curative power, because it opens the way to the evolution and development of many effective new penicillin products. The significance of this finding is brought out by the fact that many American pharmaceutical companies have offered to collaborate in research and development with Beecham Laboratories concerning this discovery.—*Brit. Vet. J. (May, 1959): 181.*

Salt Poisoning

in Wisconsin Wildlife

D. O. TRAINER, M.S.
Lars KARSTAD, D.V.M.

SODIUM CHLORIDE (NaCl) poisoning has been reported to occur among domestic swine,[2,5] poultry[1,2,5,6,9,12] and, rarely, among other farm animals.[11] The source of salt in these cases is usually brine used in curing processes which is either fed or carelessly left available to susceptible animals. Poisoning may also be secondary to "salt hunger" in animals which do not have access to salt for a period and which are suddenly provided with salt in large quantities.

During the winter of 1958-1959, wildlife mortalities occurred in Wisconsin which were attributed to salt poisoning. The source of salt in these cases was sodium chloride placed on state highways to control the slippery conditions produced by ice and snow.

Field Observations

There were 10 cottontail rabbits, 2 bobwhite quail, 1 ring-necked pheasant, and 1 domestic, but free-ranging, pigeon presented for diagnosis of conditions characterized by one or more of the following signs: loss of fear, depression, tremors, torticollis, retropulsion, partial paralysis, and circling in one direction. All specimens originated in five southern Wisconsin counties within a 40-mile radius of Madison. Numerous additional reports were received from this five-county area of similar cases, mostly in cottontail rabbits. Several specimens were submitted live and retained for a period of observation before they were killed for virologic, bacteriologic, and histopathologic examination. Others were received at the laboratory in frozen condition. Some of these were not suitable for detailed study, because of the effects of freezing and thawing, or the manner in which they were killed.

Gross and Microscopic Pathology

Gross postmortem examination revealed nothing that could be held responsible for the signs of nervous derangement observed. The stomach of 1 of the rabbits and the gizzard of 1 quail contained small amounts of blue-stained ingesta.

For histopathologic study, 5 rabbits, 1 quail, 1 pheasant, and 1 pigeon were received in suitable condition. Microscopic pathologic changes in the brains of the animals consisted of perivascular accumulations of leukocytes, scattered areas of glial cell proliferation, nerve cell degenerations and necrosis, and focal areas of edema of brain tissue. These changes were most marked in the brain stem and cerebellar areas (fig. 1). The perivascular leukocytic infiltrations were either composed entirely of mononuclear cells or, as in the case of the pigeon, quail, and 2 of the rabbits, a mixture of eosinophilic and mononuclear leukocytes.

Cultural and Toxicological Studies

A number of bacterial and viral infections were considered as possible causes for the observed encephalitis. Careful dissection of the middle and inner ear areas revealed no evidence of inflammation or abscess formation. Bacteria were not demonstrated when brain suspensions were

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inoculated into thioglycolate broth and nutrient agar. In attempts to demonstrate the presence of a viral agent, 10 per cent brain tissue suspensions were inoculated into 6- and 10-day-old chicken embryos by the yolk sac and allantoic routes; into mice and domestic rabbits intracerebrally, subcutaneously and intraperitoneally; and into monolayer epithelial cell cultures of bovine kidney. There was no evidence of viral growth.

Blue-stained gizzard contents from the quail were tested for bile pigments with negative results. At this point in the investigation, it was observed that salt placed on roads in the vicinity of Madison was stained a pale blue. Inquiries from the county highway departments revealed that this salt was sodium chloride, and the blue color was due to the presence of household bluing (ferric ferrocyanide Fe_4 $[Fe(CN)_6]_3$) added to the salt for marking purposes. This information, combined with the observed histopathology, led to a suspicion that the condition found in the animals was a toxic encephalitis caused by excessive amounts of sodium chloride. Ferrocyanide compounds are not toxic because they are insoluble and do no release hydrocyanic acid.[8]

Experimental

In attempts to reproduce the conditions of nervous derangement seen in naturally affected animals, 16 ring-necked pheasants and 8 cottontail rabbits were used. Varying amounts of a saturated water solution of road salt were given to 5 pheasants and 1 rabbit; varying amounts of a saturated (36%) solution of reagent grade sodium chloride were given to 7 pheasants and 7 rabbits; and 4 pheasants were maintained for two successive seven-day periods on a balanced poultry mash with the addition of 2 per cent and 4 per cent, respectively, of crystalline sodium chloride. Detailed studies of the experimentally produced disease will be described in a subsequent paper.[7]

The results of these experiments are summarized as follows: Sodium chloride (3 Gm.) administered in a single dose as a saturated water solution directly into the crop of an adult (1,200 to 1,400 Gm.) pheasant, or into the stomach of an adult (1,100 to 1,200 Gm.) rabbit was usually sufficient to produce death within 24 hours, invariably if the supply of drinking water was restricted.

Repeated small doses of salt produced no illness if the amount of drinking water was

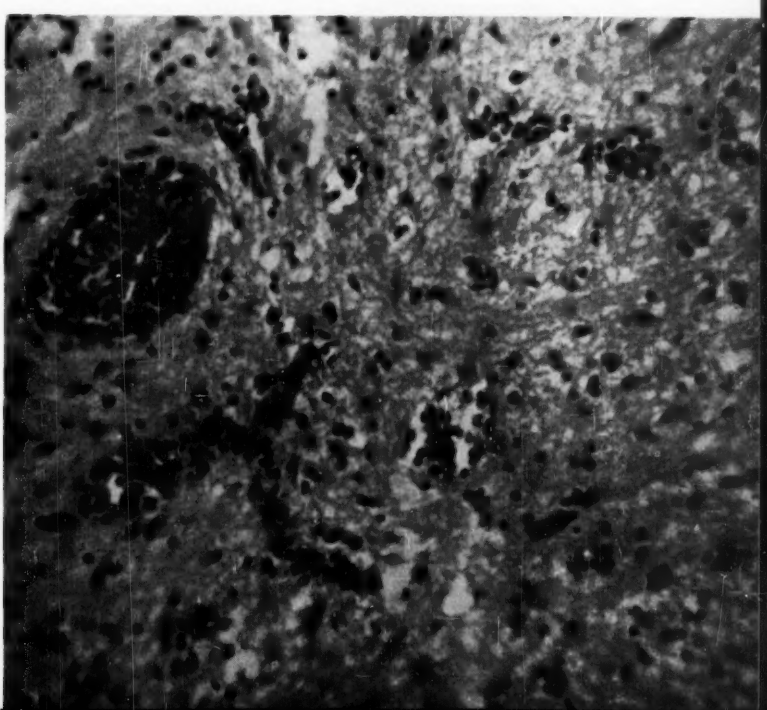

Fig. 1—Medulla of pigeon (field case) showing encephalitic changes believed due to sodium chloride intoxication. Changes consist of pronounced edema, nerve cell degeneration, and perivascular leukocytic infiltration containing many eosinophils. H & E stain; x 300.

not restricted. Identical results were obtained with both the ferric ferrocyanide-treated sodium chloride and reagent grade sodium chloride. In pheasants fed increased amounts of sodium chloride added to their dry mash, signs of intoxication appeared only when the quantity of drinking water was restricted.

The signs of disease observed in the experimentally treated pheasants and rabbits were, in general, the same as those seen in the naturally occurring cases. The earliest signs were depression and thirst followed later by excitement, tremors, torticollis, opisthotonus, retropulsion, complete incoordination, coma, and death. All of these signs, however, were rarely seen in the same animal. There was no uniform pattern of clinical signs observed.

Gross pathologic changes were either absent or consisted of edema and hemorrhages. Collections of fluid beneath the cornified epithelium of the gizzard were often seen in affected pheasants. Ascites was present to a slight degree in 2 of the rabbits. Kidney hemorrhages were seen occasionally in both pheasants and rabbits, and extensive hemorrhage into the wall of the stomach occurred in 1 rabbit.

Microscopic histologic changes in the brain were similar in many respects to those seen in field cases. These consisted chiefly of edema, congestion, hemorrhages, and cellular degenerations, chiefly in the brain stem and cerebellum. Perivascular leukocytic infiltration was seen only in the pheasants maintained on a high sodium chloride diet for a period of two weeks (fig. 2). Eosinophils were never present in large numbers. Histopathologic changes in other organs were either absent or variable. Pulmonary edema, pulmonary, hepatic, and renal congestion and hemorrhages, and renal tubular necrosis were seen in some cases.

Discussion

The histopathologic changes produced experimentally in the brain by toxic doses of sodium chloride have been studied chiefly in swine.[4,10] In this species, the condition has been called eosinophilic meningoencephalitis because of the characteristically abundant eosinophilic infiltration. Our observations on natural and experimental sodium chloride poisoning in pheasants and rabbits indicates that presence of eosinophils in leukocytic infiltrations is irregular. A second point of difference is the chief

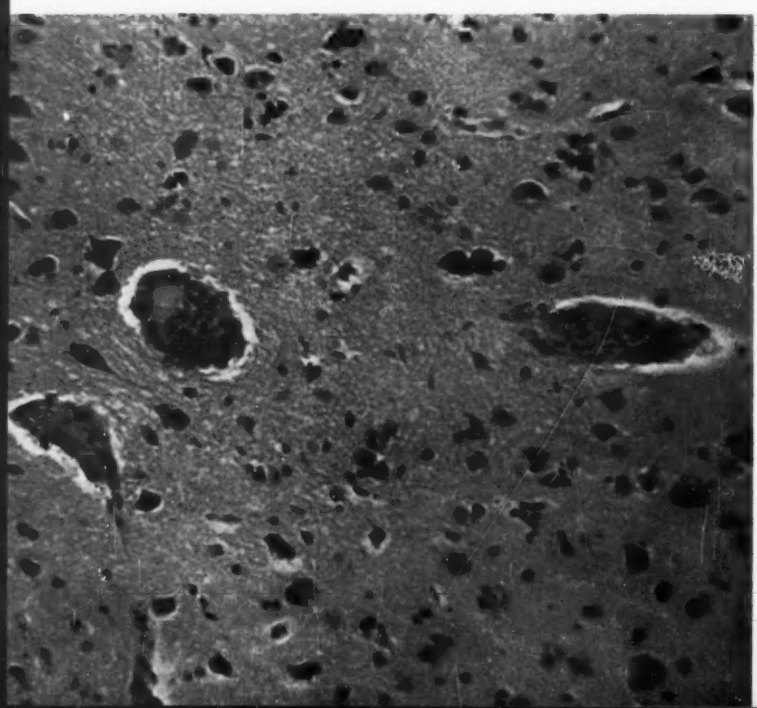

Fig. 2—Midbrain of pheasant showing experimentally produced sodium chloride encephalopathy. Pathologic changes consists of nerve cell degeneration (intensely basophilic neurones), perivascular edema, and perivascular leukocytic infiltration, chiefly mononuclear in type. H & E stain; x 300.

location of brain lesions. In swine, these are restricted to the cerebral cortex, while in rabbits and pheasants they have been more consistently found in the brain stem and cerebellum. While sodium chloride poisoning in poultry has been studied by a number of investigators, little or no attention has been given to the possible occurrence of histologic changes in the brain.[1,3,5,6] It is, therefore, not known whether the presence of eosinophils is characteristic of sodium chloride encephalitis in poultry.

The factors which appear to predispose to salt poisoning in wildlife are worthy of consideration. The winter of 1958-1959, when these cases occurred, was unusually severe in southern Wisconsin. The snowfall totaled 67.3 inches, and there were 41 days when temperatures registered below zero F. These factors resulted in excessive salting of roads and eliminated an available water supply for salt victims. More than 60,000 tons of sodium chloride were spread on state highways during the winter. It is probable that the heavy snow cover predisposed to "salt hunger" in the wildlife populations.

While birds, such as quail, pigeons, and pheasants, could conceivably obtain salt by accident which picking up grit along roads in winter, it it probable that rabbits would acquire toxic doses of salt voluntarily. In these cases, hunger for salt must be a predisposing factor. Rabbits in need of sodium chloride might then take excessive amounts when a readily available supply was found. While the quantity of salt ingested under these circumstances might not be fatal in the presence of a readily available water supply, the number of fatalities may be increased when the only source of water is snow, which the animals must eat. Salt poisoning in wildlife is, therefore, considered to be an accidental disease. Due to the difficulties encountered in detecting and estimating mortality in wildlife populations, its frequency of occurrence is unknown.

Summary

Salt (NaCl) poisoning was diagnosed in Wisconsin in wild rabbits, pheasants, quail, and a pigeon during the winter of 1958-1959. Affected animals showed signs of severe derangement of the central nervous system. A similar disease picture was experimentally produced by the administration of sodium chloride to wild rabbits and pheasants. The source of sodium chloride in the naturally occurring disease was found to be salt spread on highways to control slippery road conditions. It is believed that unusually severe weather and heavy snowfall predisposed to poisoning of wildlife by creating "salt hunger" and restricting water intake in affected animals.

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X-Ray Diagnosis of Cysticercus

Cysticercus infection can be determined in living swine by radiographs of their elbow and popliteal regions. Fully developed parasites in the muscles contain enough calcium to produce round or oval shadows of miliary size.—*Von S. Rapic et al. in Berl. u. Münch. tierärztl. Wchnschr. (Aug., 1959): 300.*

Florida Screwworm Eradication Facilities Closed

The facilities located at Sebring, Fla., for production of flies used in the screwworm eradication program were closed and the dispersal of sterile flies was discontinued in the southeastern states as of November 14. This closing date was made possible by progress in eradicating the screwworm from the Southeast—a cooperative effort by the USDA, the Florida Livestock Board, and other southeastern states.

The buildings and equipment will be maintained on a standby basis but all flies used as breeding stock will be destroyed. If it is necessary to resume operations at the Sebring Laboratory, stock for a new fly colony can be obtained from a USDA research laboratory at Kerrville, Texas. An office will remain open at Sebring, and samples of worms submitted for identification by livestockmen and others will be processed as usual.

Program officials report that no screwworms have been found in Florida since June 17, and that no cases have occurred in South Carolina, Georgia, or Alabama this year. Prior to this program an estimated 40,000 cases per month had been reported in this area. Although a number of cases have occurred in Mississippi recently near the Mississippi River, intensive survey and spraying operations have been initiated to prevent spread of infestations.

Screwworm flies have been reared in an artificial medium at the rate of about 50 million flies a week in the laboratory at Sebring, Fla., and made sexually sterile by exposure to radioactive cobalt. Since July, 1958, more than 2.75 billion sterile flies have been released over nearly 85,000 sq. mi. in Florida, and parts of Alabama and Georgia. The program is based on the principle that sterile male flies mate with native female flies which produce eggs that do not hatch. Thus, the species is eventually wiped out.

Vesicular Exanthema Eradicated

A Federal quarantine for vesicular exanthema (VE) was lifted from the last area of the country under restriction, Deptford and Monroe Townships in Gloucester County, New Jersey, in August. This move completes the eradication program of VE in the United States and culminates a seven-year state-federal cooperative program.

The eradication effort involved (1) passage of laws forbidding the feeding of raw garbage to swine; (2) quarantines; (3) prompt disposal of infected and exposed swine; and (4) thorough disinfection of all contaminated facilities. Because raw garbage proved a major source of infection and spread of VE great stress was placed on passing laws requiring that all garbage to be fed to swine be cooked. Now garbage-cooking laws or regulations are in effect in 49 of the 50 states.—*USDA Press Release, Oct. 22, 1959.*

Cholera Control Through Vaccination Tested

Federal-state hog cholera control experiments of pilot test dimensions underway in Florida have shown that 92.2 per cent of the pigs and 89 per cent of the vaccinated herds in the test area are adequately protected.

About 60,000 swine on 1,500 individual farms are now being used in the experiment. About 60 per cent of the pigs are being vaccinated with modified live virus vaccines and anti-hog cholera serums.

From April, 1957, when the experiment started, until the present time, there have been 76 suspected cholera cases reported. Of these, 37 were tested by inoculation which resulted in 12 positive and 25 negative tests for hog cholera virus.—*USDA Press Release, Oct. 28, 1959.*

Bilateral Adrenalectomy

in the Equine Species

E. A. USENIK, D.V.M., Ph.D.
J. P. ARNOLD, D.V.M., Ph.D.

SURGICAL REMOVAL of the adrenal glands has long served as a valuable research procedure. Although commonly performed in the small laboratory animals, it has seldom been reported in domestic animals, especially the larger species although two writers[2] reported an adrenalectomy in the goat.

The effects of bilateral adrenalectomy in sheep have been studied,[3] and, more recently, the first report of adrenalectomy in the bovine species was made.[1]

Since the surgical technique of adrenalectomy in the equine species has not been described in the available literature, it is the purpose of this paper to present the technique. In addition, information relative to hormonal substitution therapy is given.

Experimental Procedure

Preoperative treatment consisted of withholding feed for 48 hours and water for 24 hours. The operative site was clipped and for five days prior to surgery was scrubbed daily for five minutes with a detergent containing hexachloraphene. The surgical site was again scrubbed following administration of the anesthetic agent, and mild tincture of iodine and 70 per cent isopropyl alcohol were applied. Surgical anesthesia was accomplished by intravenous infusion of 6 per cent chloral hydrate solution.

The surgery was performed in two stages. The left adrenal gland was removed first; the right adrenal was removed approximately three weeks later. Prior to right adrenalectomy, 100 mg. of *delta* l-hydrocortisone* was injected intramuscularly for two days. Immediately following right adrenalectomy, 100 mg. of *delta* l-hydrocortisone was administered intravenously, and an additional 100 mg. of the drug was given intravenously during recovery from anesthesia. Following surgery, the animals were given 5 Gm. of tetracycline in 2 liters of isotonic saline solution intravenously daily for three to five days.

Only the procedure for left adrenalectomy will be described as that for the right was essentially the same except for locations of incisions.

A 10-inch incision was made in the left paralumbar fossa 3 inches ventral to the transverse processes of the lumbar vertebrae and 2 inches caudal to and parallel to the last rib. This incision was continued through the external and internal abdominal oblique and transverse abdominal muscles, transverse fascia, and peritoneum. A large Finochietto rib retractor was used to open the incision and expose the peritoneal cavity. Sterile towels moistened in isotonic saline solution were used to pack the intestines out of the surgical area.

The left kidney was palpated, and a small opening was made by blunt dissection in the lumbar parietal peritoneum near the cranial medial border of the kidney. The perirenal fat was carefully explored to locate the left adrenal gland which lies against the cranial medial border of the kidney. The adrenal gland was gently freed from its attachments, avoiding unnecessary trauma to the cranial mesenteric artery which lies in close contact to its medial

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This paper is based in part on a thesis submitted by the senior author to the Graduate School of the University of Minnesota in partial fulfillment for the Pd.D. degree.

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*d-CORTEF was supplied through the courtesy of the Upjohn Co., Kalamazoo, Mich.

border. During this procedure, unnecessary trauma was avoided to the aorta, renal vessels, and left celiac ganglion which are closely related to the left adrenal gland. The major adrenal vessels were then clamped with right angle biliary forceps. Attempts to ligate the adrenal vessels met with failure due to the depth of ligation and the fragility of the vessels. However, hemorrhage was minor and easily controlled by packing the adrenal bed with gelatin sponges.** Aqueous crystalline penicillin, 2,000,000 units in 20 ml. of sterile water, was injected into the peritoneal cavity.

During right adrenalectomy, efforts were made to avoid unnecessary trauma to the posterior vena cava, pancreas, cecum, and right renal vessels which are closely related to the right adrenal gland.

The incision in the abdominal wall was closed in layers, utilizing chromic catgut in the peritoneum, fascia, and muscle layers. The skin was closed with a plastic suture material.

The mule died 14 hours following right adrenalectomy; in the 2 horses, recovery was uncomplicated, with the exception of partial dehiscence of the right abdominal incision following removal of skin sutures in 1 animal.

Substitution Therapy

Of the 2 animals which survived complete adrenalectomy, 1 was maintained for 90 days and the other for 80 days on periodic substitution therapy consisting of desoxycorticosterone acetate† and *delta* l-hydrocortisone. In addition, 60 Gm. of sodium chloride was administered daily on the feed. Hematocrit levels were determined daily. Desoxycorticosterone, in dosages

**Gelfoam is the tradename for gelatin sponges produced by the Upjohn Co., Kalamazoo, Mich.

†DOCA was supplied through the courtesy of the Upjohn Co.

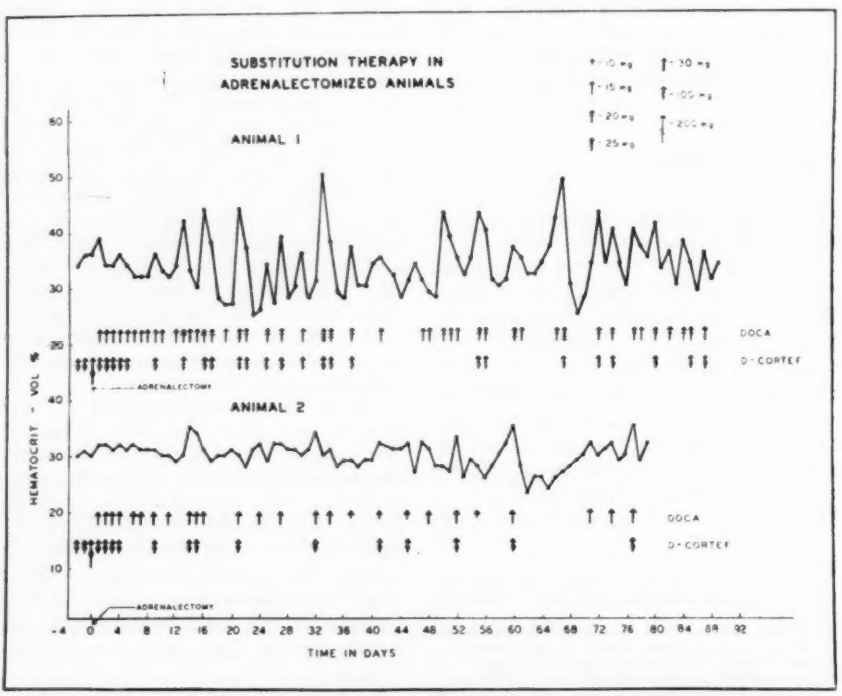

Fig. 1—Graph showing results of substitution therapy used in adrenalectomized horses.

varying from 10 to 30 mg. was administered intramuscularly following an elevation of hematocrit values and deterioration of general physical condition. Periodically, 100 mg. of *delta* l-hydrocortisone was given intramuscularly to promote gluconeogenesis and decrease susceptibility to stress. Information relative to hematocrit levels and hormonal therapy is presented (fig. 1).

Necropsy

At necropsy, no microscopic adrenal tissue could be found in 2 of the 3 animals. Microscopic sections taken from the former adrenal sites did not reveal any adrenal tissue. In both animals, dense connective tissue was present in the area of the adrenal beds. In 1 animal, a small, well-circumscribed abscess was found just dorsal to the left kidney.

The third animal was sold for animal food with the stipulation that it be slaughtered immediately. However, the purchaser did not believe that this was necessary as the horse appeared to be healthy. The animal died six days later, with signs of acute adrenal insufficiency. Necropsy was not performed.

Summary

The adrenal glands of the equine species can be successfully removed and the animal maintained on substitution therapy.

If the hematocrit is used as a guide for dosage, *delta* l-hydrocortisone, desoxycorticosterone acetate, and sodium chloride can be used to maintain adrenalectomized animals.

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Surgical Correction of

Intussusception

in a Lamb

William R. VAN DRESSER, B.S., D.V.M.
M. A. RAMIREZ, D.V.M., M.S.

A HAMPSHIRE LAMB, 3-weeks old, was examined because of anorexia during the previous day. Dullness and depression was marked but body temperature was normal. Palpation revealed sensitiveness, distention, and presence of gas throughout the abdominal region. There was no evidence of a recent fecal passage. A tentative diagnosis of intestinal obstruction was made.

The lamb was given a mild laxative via stomach tube. An enema was also given after which a small number of dry fecal pellets were passed.

Re-examination in eight hours revealed subnormal body temperature and signs of acute colic. Passage of fecal material had not occurred since the previous examina-

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tion. An exploratory laparotomy was performed to confirm the diagnosis and to correct the condition, if possible.

The area of the right flank was prepared for surgery. After local infiltration with lidocaine hydrochloride,* an incision through the abdominal wall was extended from the lumbar transverse processes to the midline, 2 inches from the posterior border of the last rib.

Exploration revealed an intussusception involving the middle third of the jejunum. An end-to-end anastomosis was indicated, since it was necessary to remove approximately 2 inches of the necrotic gut. No intestinal clamps were available, so the cut ends of the intestine were held by an assistant between the thumb and forefinger. This minimized damage to the small friable gut and aided in suturing, since the position of the ends could be changed readily. The smallest suture material** available was used to accomplish the anastomosis. A small amount of ether was given to reduce straining and thus facilitate replacement of the intestines. Biosol sterile solution† (100 mg.) was placed in the peritoneal cavity prior to closing the incision with suture material similar to that used for the anastomoses.

Postoperatively, glucose (12½%) was given at 12-hour intervals for 48 hours. Biosol sterile solution (50 mg.) was given intramuscularly twice daily for three days.

The lamb began to nurse 24 hours after surgery. The abdominal distention started to recede at 36 hours, and in 72 hours the abdomen appeared normal. Normal fecal passage began 48 hours after surgery and recovery was uncomplicated.

This case report illustrates the gratifying results which may be obtained in ovine surgery.

*Xylocaine is produced by Astra Laboratory, Scotia, N.Y.
**Vetaphil is distributed by Jackson Importers, Washington, D. C.

†Neomycin is produced by the Upjohn Co., Kalamazoo, Mich.

Anesthesia for Cesarean Section in Dogs

The bitch should be allowed to labor from one to three hours before surgery is performed. Reasons for this: (1) the owner may be mistaken about the breeding dates, thus influencing the veterinarian to deliver pups too early; (2) there will be less hemorrhage from the placental attachments; (3) bitches in labor struggle less; (4) the uterus will shrink to normal size more quickly; and (5) occasionally, the bitch will whelp normally and surgery will not be necessary.

Give ¼ gr. of morphine with atropine subcutaneously, wait 30 to 60 minutes, then give 1/300 gr. of apomorphine subcutaneously (given in this sequence, the latter will not cause vomition). Prepare the skin for a midline incision and infiltrate the subcutaneous tissues and muscle layers with procaine on both sides of the median line along the length of the proposed incision.

Next give 0.25 to 0.33 cc. pituitrin intramuscularly to start uterine contractions, to loosen the placenta, and to keep down excessive hemorrhage when the placenta is removed. To prepare a stock solution of apomorphine that will last two months, add 1/10 gr. of the drug to 30 cc. of distilled water or physiological saline solution in a sterile rubber-stoppered vial. The solution soon turns green but this does not interfere with the desired action. This drug should never be given to surgical patients unless morphine precedes it. From 0.5 to 2.0 cc. of the stock solution is given, depending upon the size of the bitch.—*John Micuda, D.V.M., Phoenix, Ariz., at the Texas V.M.A. meeting, Oct., 1959.*

Hemoglobin Determination in

Swine Anemia

A Practical Method

John J. UPDIKE, D.V.M.

CONFINEMENT raising of swine on concrete is making rapid gains in the Midwest due to increased farm efficiency systems. Since confined pigs no longer have contact with soil, iron from this source is not available to them. As a result, iron deficiency anemia in suckling pigs has become a serious problem.

It is important that veterinary practitioners dealing with swine problems counsel the swine raiser on the causes, identification, prevention, and treatment of anemia in pigs of all ages, especially the young. To emphasize the complexity of the anemia problem to the swine raiser, a practical, scientific method of making hemoglobin determinations offers a logical means. A specialized type of colorimeter, the AO Spencer Hb-Meter,* for convenient evaluation of hemoglobin content of blood is ideally suited for this purpose. It has been used successfully by physicians and veterinarians for many years. The instrument is pocket-size and permits hemoglobin determinations in three minutes.

Procedure

A drop of fresh blood from the tail, ear vein, or anterior vena cava is suitable for testing. Cutting off one-fourth of the tail and collecting the second drop of blood is a satisfactory collection technique in small pigs. The blood is placed directly on the surface of a special glass chamber and is hemolyzed by agitating gently with a hemolysis applicator. A cover glass is placed over the sample and held to the chamber by a clip. The completed chamber is then inserted into the side of the hemoglobin determination instrument, and a reading is made by matching the green colors of an illuminated split field. Hemoglobin concentration is read on a scale on the side of the instrument in grams of hemoglobin per 100 ml. of blood (fig. 1).

Discussion

During the past year, based on more than 250 hemoglobin readings, the following conclusions regarding swine anemia problems have been formulated: (1) Iron deficiency anemia varies in severity from one farrowing to the next on the same farm even though husbandry procedures are unchanged. This means that injectable iron dosing must be altered to fit the existing situation. (2) It is impossible to diagnose iron deficiency anemia in a herd of pigs without hemoglobin determinations unless the acute stage is present. Acutely affected pigs often will not fully recover, even though iron is administered. (3) Available injectable iron compounds vary in iron content and in their therapeutic effectiveness. In general, response is related to the amount of iron in the preparation used. (4) The fastest growing pigs yield the lowest hemoglobin readings and the so-called "runt," or "poor-doing," pigs uusally have the highest hemoglobin levels within a given group. Therefore, it is important to select average or better pigs from a herd for sampling.

A collection of hemograms[1] indicates that the normal hemoglobin level of a pig may

Dr. Updike is a general practioner in Elwood, Ind.

The AO Spencer Hb-Meter is manufactured by the American Optical Co., Buffalo, N.Y.

[1]Calhoun, M. L., and Smith, E. M.: Hematology and Hematopoietic Organs. In "Diseases of Swine," edited by H. W. Dunne. Iowa State College Press, Ames (1958): 38-39.

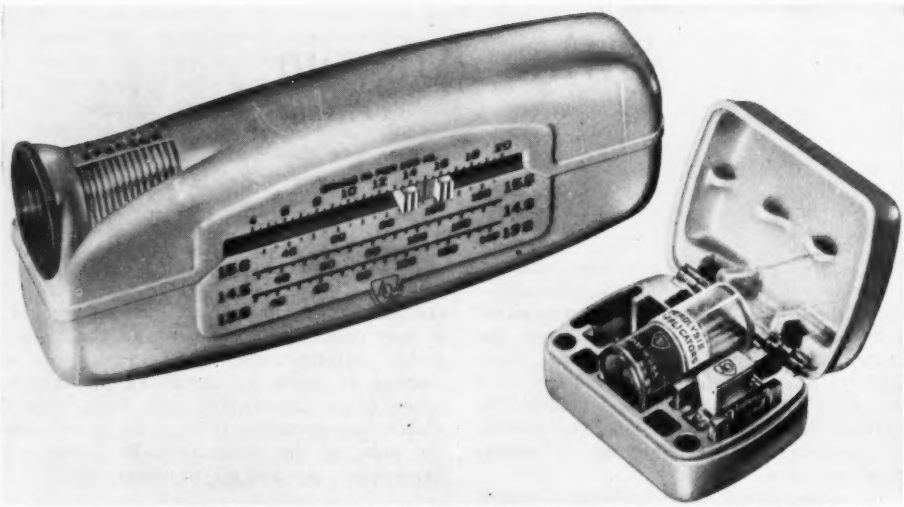

Fig. 1—For rapid field determinations of iron deficiency anemia in swine, the AO Spencer Hb-Meter with Blood Chamber and Hemolysis Application has proved to be satisfactory.

range from 9.0 Gm./100 ml. upward. Lower hemoglobin levels indicating anemia might result in low resistance to disease, depressed growth, and death. Since using the hemoglobin determination instrument, it has been possible to substantiate these observations.

After making hemoglobin determinations on pigs at a number of farms, the practitioner will recognize approximately when and how many readings will be of practical value in each situation. An examination of 6 pigs per 100, 14 to 21 days after the initial iron injection at 2 to 4 days of age, will give a good indication of how well the parenteral preparation is controlling anemia in the drove. Then, advice concerning additional injections can also be given. Comparing several pigs that have had varied amounts of one or more injectable iron preparations with similar untreated pigs is often helpful in gaining pertinent information on hemoglobin response to therapy.

Hemoglobin determinations on sick pigs are extremely important since anemic pigs often do not respond to therapy. The use of the Tallqvist method to get immediate results seemed to be practical, but its accuracy was not much better than gross examination of the blood sample.

Recently it has been pointed out that market hogs raised on concrete or frozen ground may develop anemia and require supplemental iron. Thus, the hemoglobin determination instrument could be used to advantage in this situation. It may also be used to diagnose anemia in young calves as well as the young of other species. Hemoglobin determination is important in mature animals with parasitism and other conditions in which anemia is a problem to determine more accurately the ideal therapeutic requirements.

Summary

Now that increasingly greater numbers of swine are raised on concrete, iron deficiency anemia is a serious problem, especially in nursing pigs. It is important to accurately diagnose this condition so that corrective measures can be taken. A hemoglobin determination instrument (AO Spencer Hb-Meter) is a practical, accurate device which permits the veterinarian to determine the average hemoglobin level of animals. An intelligent application of parenteral iron therapy can be made with this diagnostic information.

Incidence of

Intestinal Parasites

in German Shepherd Dogs

Ralph E. THOMAS, D.V.M.

IT WAS ROUTINE procedure at the U.S. Army Dog Training Center to perform a fecal examination on each dog prior to its acceptance for duty with the Armed Forces. The examination results of 1,027 dogs, during the period 1956-1957, have been tabulated (table 1).

TABLE 1—Results of Survey of Intestinal Helminth Parasites in 1,027 German Shepherd Dogs

Parasite	No. of dogs infected	Total dogs examined (%)
Hookworm	212	21
Whipworm	103	10
Roundworm	46	4
Tapeworm	30	3
Negative samples	693	67

Approximately 98 per cent of the dogs included in this survey were between 1 and 3 years old. The remaining 2 per cent were 9 to 12 months old. All were German Shepherd Dogs, and 90 per cent were males.

Dogs surveyed in this report were acquired from a widespread area. Dogs were received from 44 of the 48 states and the District of Columbia. The states from which no dogs were obtained were Delaware, Louisiana, North Dakota, and West Virginia. The states contributing the largest number of dogs were Missouri, Ohio, Virginia, Pennsylvania, and Colorado.

The purpose of performing the fecal examinations was to identify the genera of intestinal parasites present, if any, so that treatment could be initiated where indicated. No effort was made to identify the species of parasite because the therapeutic agent is usually the same regardless of species.[3,5,6,8]

Dr. Thomas was unit veterinarian for the U. S. Army Dog Training Center from August, 1954, until June, 1957. He is currently assigned to the University of Tennessee Atomic Energy Commission Agricultural Research Laboratory, Oak Ridge, Tenn.

Methods

Two methods of examining fecal material were used. Approximately 40 per cent of the examinations were made using the sugar flotation method of Coffin.[4] The remaining samples were prepared by adding a small amount of feces to 10 cc. of a solution consisting of equal parts of glycerin and saturated solution of magnesium sulfate. The preparation was thoroughly mixed and permitted to stand for one hour before examination.

During the period covered by this survey, fecal samples were also collected from dogs with clinical signs of enteritis. These samples were submitted to the laboratory, U. S. Army Hospital, Fort Carson, Colo., for analysis. Of the laboratory samples submitted, 5 cases of Isospora coccidiosis and 6 cases of giardiasis were diagnosed.

Results

Of the 1,027 dogs examined, 52 (5%) were found to be harboring two species of parasites. Only 2 dogs showed evidence of having three species of intestinal parasites. This finding does not agree with another survey of 200 dogs in which no cases of multiple infection were reported.[1]

Of the dogs harboring two infections, the hookworm-whipworm combination was most common, and the hookworm-roundworm combination next most common.

Discussion

Although the purpose of the survey was not to determine the efficacy of diagnostic methods employed, it is believed that either flotation method outlined is simple, practical, and reliable for a practitioner to use in determining presence of intestinal helminth parasites in dogs.

The 5 dogs in which coccidia were found showed clinical signs of persistent blood-tinged diarrhea that disappeared following treatment with sulfaguanidine, 6 Gm. daily, for five days. The cessation of clinical signs following treatment suggests that the parasite was pathogenic, although it often occurs without apparent clinical effects.[7]

Consistently, copious loose stools from dogs in which *Giardia lambdia* was found ceased after five days of atabrine (100 mg. t.i.d.) therapy. Therefore, it is probable that these organisms were pathogenic.[2]

No dog was rejected because of intestinal parasitism. Many dogs gained weight and displayed increased receptiveness to training after therapy was completed.

Summary

A survey of intestinal parasites harbored by 1,027 adult German Shepherd Dogs on arrival at the U. S. Army Dog Training Center, Fort Carson, Colo., is reported.

Findings showed that 693 (67%) were apparently free of intestinal parasites; 212 (21%) had hookworms; 103 (10%) had whipworms; 46 (4%) had roundworms; and 30 (3%) had tapeworms.

Coccidiosis was diagnosed in 5 dogs, all of which responded favorably to sulfaguanidine therapy.

Giardiasis was diagnosed in 6 dogs, all of which responded favorably to atabrine therapy.

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Public Health Significance of Canine Lymphoma

Base line population data as to age, sex, and breed of New Jersey dogs were obtained from an analysis of 14.7 per cent of the 385,427 records of dogs licensed in New Jersey in 1957. The median age was found to be 3.7 years and 9.7 per cent were 10 years of age and older. There were more males than females, but longevity of the two sexes was not significantly different. Breed distribution indicated that 20 breeds accounted for 90 per cent of the licensed dog population, of which one third were mongrels. Larger breeds of dogs over 10 years of age are relatively rare as compared to the smaller breeds. Against this population background, the first canine lymphoma registry on a state-wide basis has been established. A confirmed diagnosis based on biopsy and necropsy specimens submitted by 130 veterinary hospitals serves as a source for epidemiologic data regarding environmental influences in the distribution of canine and human lymphoma-leukemia.—[*D. Cohen, S. Booth and O. Sussman: An Epidemiological Study of Canine Lymphoma and Its Public Health Significance. Am. J. Vet. Res., 20, (Nov., 1959): 1026-1031.*]

Absence of

Posterior Vena Cava

in a Dog

Charles R. WALLACE, D.V.M.

ABSENCE OF the posterior vena cava has rarely been reported in domesticated animals. Such venous anomalies are less often observed than anomalies of the heart and aorta. This is due to lack of conspicuous clinical signs and possibly to the actual rarer occurrence of venous anomalies. Absence of the posterior vena cava in man is referred to as "persistence of the supracardinal system," "persistent posterior cardinal veins," "persistent left inferior vena cava," and "azygos continuation."

The rarity of this anomaly in man is indicated by a review which showed that only 24 cases were reported prior to 1957.[3] Nineteen were diagnosed by postmortem examination, and five were found antemortem by venous angiography. Those investigators who made the review observed this anomaly by venous angiography in an 18-week-old infant. In man, about 50 per cent of these cases are accompanied by a persistent left superior vena cava and situs inversus viscerum. Quite often a biloculate heart with pulmonary stenosis is also found. Due to the rarity of reported anomalies in dogs,[4] no similar comparisons can be discussed.

During a heart-lung bypass procedure on a clinically normal 1-year-old 17.7-kg. male mongrel (Augusta dog), it was observed that the azygos vein was as large as the anterior vena cava and that the thoracic portion of the posterior vena cava was half normal size. During necropsy, it was observed that the renal veins, about 7 cm. in length, joined the persistent right supracardinal vein posteriorly at an acute angle (fig. 1, part B). All posterior veins emptied into this vessel. The portal venous system was normal. A common hepatic vein emptied into the posterior of the right atrium. The abdominal lymphatic vessels were abnormally engorged, but no study was made of them. No other abnormalities were found in the cardiovascular or other systems.

The normal posterior vena cava is compared with the anomaly found in the Augusta dog and with the 1 reported by the Mayo group[4] (fig. 1, part C). This latter case involved an apparently normal 10-month-old female mongrel which died from pneumonia associated with distemper. Although the portal system emptied into the azygos vein and the hepatic artery was the only blood supply to the liver, there were

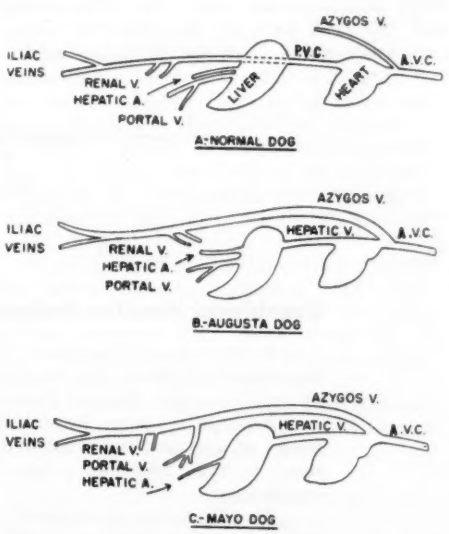

Fig. 1—Diagrammatic comparison normal posterior vena cava (A) with anomalies observed at Augusta (B) and at Mayo (C).

Dr. Wallace is assistant research professor of physiology at the Medical College of Georgia, Augusta.

evidently no clinical symptoms from possible malfunctioning of the liver.

The embryologic development of the venous system is discussed in several texts.[1,5] In general, the venous system develops from three paired veins: the umbilical veins, the vitelline veins, and the cardinal veins. The posterior vena cava develops from the cardinal vein system which consists of the precardinals, the common cardinals, and the postcardinals. These postcardinals first develop along with the mesonephroi and drain the caudal part of the fetus. Shortly thereafter, the subcardinals develop, along with several anastomoses to the postcardinals. As the subcardinals become functional, the postcardinals regress. The supracardinals begin developing at this time and later become the azygos and the posterior vena cava caudal to the kidneys.

Normally, the posterior vena cava is composed of the following segments: (1) hepatic, (2) prerenal, (3) renal, and (4) postrenal. The hepatic segment is derived from the proximal right vitelline vein and the hepatic sinusoids. The prerenal segment is derived from the right subcardinal. The renal segment is derived from the anastomosis between the right sub- and supracardinal veins. The postrenal segment is derived from the posterior portion of the right supracardinal vein. The iliac veins and the first part of the posterior vena cava are derived from the right postcardinal vein. This anomaly is attributed to the failure of the development of hepatic and prerenal segments of the posterior vena cava. The right supracardinal vein persists, providing venous drainage for the posterior of the body and the kidneys.

Venous anomalies are probably more common than indicated here, but they are not observed because of their inconspicuous clinical effects. In the case reported here, the dog was clinically normal and was being used in an experimental procedure. As many investigators have suggested, it is advisable to consider the possibility of such anomalies in experimental work. It may help explain unsuccessful catheterization of the right side of the heart when approached from the saphenous or femoral vein. Such an anomaly could be an important consideration in pneumonectomy.[2]

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Combined Vaccine Includes Rabies Antigen

A three-in-one modified live virus vaccine for distemper, hepatitis, and rabies has been under study for more than a year at the Connaught Medical Research Laboratories in Canada.

Susceptible pups have been successfully immunized at 8 weeks of age, and the number of antibodies produced was almost equal to that produced using separate distemper and hepatitis vaccines.

The Canadian government has sponsored combined vaccinations for distemper and rabies, particularly among dogs in Canada's far north, for about four years.—*Ohio Vet., 7, (1959): 3.*

Treatment of

Canine Coccidiosis

Using Nitrofurazone and Sulfonamides

Daniel DUBERMAN, D.V.M.

THIS REPORT describes results of a comparative study of a nitrofurazone (Furadex*) and three combined sulfonamides (sulfamethazine, 0.166 Gm.; sulfathiazole, 0.166 Gm.; sulfamerazine, 0.166 Gm.—total: 7.7 gr./tablet) as treatments for canine coccidiosis caused by *Isospora felis*.

Material and Methods

In this study, 40 dogs with coccidiosis were treated. They were generally in poor condition, having been obtained from various animal shelters. All were infected with *I. felis*. Half the dogs were treated with nitrofurazone orally in three equally divided daily doses totaling 4 to 10 mg./lb. of body weight. The other 20 dogs, matching those on nitrofurazone therapy as closely as possible, were treated with three combined sulfonamides, 1 gr./lb. of body weight, divided into three daily doses.

After an initial fecal examination to establish presence of coccidia in the intestinal tract, treatment was started. Fecal examinations were performed every other day until at least five consecutive negative results were obtained. Treatment lasted five to 20 days, or until five consecutive negative fecal analyses were obtained. One month after the last treatment, another fecal examination was performed to determine presence or absence of coccidia in the stool.

Results

Results were evaluated mainly on the basis of time interval between start of treatment and control of coccidiosis, as manifested by the first fecal test negative for coccidia.

In 20 dogs treated with nitrofurazone, the time from first treatment to first negative fecal examination ranged from three to 25 days, an average of 9.3 days. One dog died during treatment, and in 1 dog coccidia never were eliminated.

In 20 dogs treated with sulfonamides, the time interval ranged from four to 23 days, an average of 9.7 days.

Fecal examinations up to one month post-treatment were negative, except for 1 dog in the group treated with nitrofurazone, which possibly was a result of reinfection.*

Discussion

It is apparent that, at least in these 20 paired cases, there was little difference in the results derived from using these two medications. The dog that died, and the 1 in which coccidia never were eliminated from the stools, were believed to have been influenced by complicating factors because all 38 remaining dogs responded favorably to treatment.

Average treatment time was slightly shorter in the group treated with nitrofurazone. This might have been the result of the relatively high, 4 to 10 mg./lb. of body weight, dosage used instead of the recommended 2 mg./lb. dosage.

The number of experimental animals used in this study limits the possible conclusions and generalizations that can be drawn from these results.

Significantly, the higher dosage of nitro-

Dr. Duberman is a general practitioner in Southampton, N.Y.

*Furadex is produced by Eaton Laboratories, Norwich, N. Y. as Furadex Ora-Bols Veterinary, containing 50 mg. nitrofurazone N.F.

*For confirmation of laboratory results, many fecal specimens were sent for analysis and culturing to Eaton Laboratories, Norwich, N. Y.; Dr. Samuel Pollock, South Orange, N. J.; and the University of Georgia.

furazone (10 mg./lb. body weight) seemed to result in no toxic side effects other than occasional vomiting. When this occurred, it was controlled by reducing dosage.

All dogs in this series were in poor condition, having come from animal shelters. General lack of resistance contributed not only to coccidial infection but also to sluggish responses to treatment.

In evaluating these drugs, it is important to consider that treatment of infections depends on such factors as development of resistant strains, general condition, and defense mechanisms of the host.

Summary and Conclusions

Results derived from this study showed that nitrofurazone was effective as a treatment for *Isospora felis* infection in dogs. However, it did not show any significant advantage over the use of three combined sulfonamides (sulfamethazine, sulfathiazole, and sulfamerazine).

Some dogs recovered in only three days while others took as long as 25 days regardless of medication given.

Otitis Externa

The treatment of otitis externa in dogs with long ears can be expedited if the ear flaps are held in such a manner that the ear canals receive adequate ventilation until recovery is complete. A surgical adhesive (purchased from almost any surgical supply house in tube form) is spread on the haired surface of each ear flap and allowed to dry for a few minutes. The flaps are then pressed together over the head where they will stay in position indefinitely and are not easily parted.—*G. H. Gilbert, D.V.M., at 46th meeting of Eastern Iowa V.M.A., Oct. 15-16, 1959.*

Iodide Mumps

A toxic reaction to iodine therapy in man, known as "iodide mumps," appears as enlarged submaxillary salivary glands. It usually subsides in two or three days after therapy is discontinued, but may recur when iodine therapy is resumed.—*What's New, 213, (Fall, 1959): 17.*

Relationship of Diet to Canine Eczema

Most authors agree that one of the main causes of eczema in dogs is vitamin-hormone imbalance. Almost without exception, we have found that dogs suffering from eczema have been given a diet nutritionally inadequate for this carnivorous species.

It is advisable to begin weaning pups at 21 days of age by giving raw meat once a day for the first three days; then twice daily for six days in amounts increasing gradually, depending upon the size and breed of the dog. Since raw meat is deficient in calcium, cod liver oil and calcium glycerophosphate should be added. The pups can be completely weaned at 30 days of age.

Until a pup is 6 months old, it is advisable to supplement the diet, two or three times a week, with raw liver, raw fish without bones, or egg yolk. Then the dog should be fed twice a day, receiving the equivalent of 5 to 7 per cent of its body weight. Once-a-day feeding is never advisable nor is the use of appreciable amounts of bones, carbohydrates, or cooked meat.—*Alfonso Alexander, president, Mexican V.M.A., at the Third Pan American Congress of Veterinary Medicine and 96th Annual Meeting of the A.V.M.A. in Kansas City, Mo., Aug. 23-27, 1959.*

Editorial

Cinosyth and Skepticism

Although the title of an article published recently in a leading pet magazine (*Dog World,* October, 1959) was prudently supplied with a question mark, it will cruelly arouse the hopes and interest of its readers in a cure for distemper. The article in question refers to a preparation called Cinosyth, an injectable material reported to cure canine distemper. Written in a foreign country by an individual designated as a veterinarian and an official judge of dogs, the article is couched in semimedicalese which may seem perfectly credible to distressed pet owners but will be utterly distasteful to our veterinarians whose lot it will be to patiently explain to their clients how unlikely it is that the claims are true. Some portions taken out of context (the italics being ours) seem to have a ring surprisingly like a piece of last-century writing.

"[In my practice, in] case after case, and *with absolute regularity,* the cure was successful."

"[But] in a first group of 25 dogs . . . treated from the 6th to the 15th day . . . I obtained *23 cases of total recovery.*"

"The second group was made up of 31 sick cases, 28 of which fully recovered."

"The product is made up of two essential parts that integrate each other: a mineral saline part, and another one formed of protein fractions of bacteric extracts that when being prepared, are submitted to a peculiar treatment."

". . . the presence of the proteic fractions and of the bacteric extracts *treated in a special way* is to be interpreted, roughly, as being the usual *aspecific therapy. . . .*"

". . . the *properdinic rate* in the animal's blood is *astoundingly efficient.*"

"It also appears that this product exerts *a certain influence on the nervous system* since, in some cases it has had power to eliminate the nervous sequela of distemper."

Hinting at the mysterious powers of the product and veiling his sentences in a fog of vague terms, the author failed to report controls, specific cases, or in other ways substantiate the story.

A product protocol for Cinosyth has also come to our attention recently. Each cubic centimeter is reported to contain:

"Proteic fractions of bacteric extracts (albumins, globulins, polysaccharides) submitted to a special treatment	y 0,25
Sodium monomethylarsinate	g 0,015
Salicylic acid	g 0,015
Sodium cacodylate	g 0,015
Calcium iodite	g 0,017
Sodium iodite	g 0,005
Sodium chloride	g 0,005
Distilled water	suff. quant. for 1 cc."

The protocol states that, pharmacologically,

"The benefic action of the proteic component cannot be traced up to the well-known active mechanism of aspecific proteino-therapy. It is independent of this: the particular treatment applied to the proteic fractions of bacteric extracts endows them with certain particular properties that render them apt to activate very highly the protective power of animal cells."

Indications for use, as reported in the protocol, are so broad it is doubtful that on a label they would withstand scrutiny by our Food and Drug Administration:

"In particular, it may be used with success in case of flue, angina, bronco-pneumonia, rheumatisms, gastro-enteritis, septicemia.

"Distemper remains however the main indication; this very serious disease caused by virus, that up to the present day, could not be efficiently fought, is now utterly conquered thanks to CINOSYTH, especially in its prodromic phase."

Happily, the veterinarian whose clients request or demand this treatment will have an opportunity to explain the advantages of a "show-me" policy with respect to promotional literature. He can assure the client that our reputable pharmaceutical firms and other institutions have sound-thinking workers who not only conduct original research but also watch the foreign markets as well and, in due time, will see that any really worthwhile treatment for canine distemper is made known and available to all.

from the *Research Journal*

Experimental Canine Bacterial Nephritis

Experimental nephritis was produced in 27 of 29 dogs by inoculating pathogenic bacteria either into the renal artery (26 dogs) or renal pelvis (1 dog). Eleven strains of *Escherichia coli*, seven of Proteus spp., and one each of *Pseudomonas aeruginosa*, *Aerobacter aerogenes*, *Serratia marcescens* and Streptococcus sp. were utilized. The organisms were recovered from the bladder urine after a period of two to 120 hours.

Nitrofurantoin was administered orally to 17 of the infected dogs at doses of 4 to 20 mg. per pound of bodyweight daily for periods up to 20 days. The drug was first administered between the fifth and the 31st day following inoculation. Sterile urine was obtained in only 3 (17.6%) of these dogs. The drug was generally well tolerated, and there was little clinical or laboratory indication that bacteria developed any significant degree of resistance to nitrofurantoin. [*—E. H. Coles and J. E. Mosier: Effects of Nitrofurantoin on Experimental Canine Bacterial Nephritis. Am. J. Vet. Res., 20, (Nov., 1959): 1020-1025.*]

Ornithosis in California Turkeys

An obligately intracellular large-particle microorganism was isolated in 1958 from diseased turkeys in California. On the basis of morphologic, tinctorial, antigenic, and pathogenic characteristics, the agent was shown to be a member of the genus *Mivagawanella* which caused ornithosis in turkeys. It differed from toxigenic ornithosis agents isolated from turkeys in other states because of its low pathogenicity for turkeys after intraperitoneal inoculation and high lethality for pigeons after intracerebral inoculation. A similar agent, as yet uncharacterized, was isolated from healthy sparrows nesting near the affected turkeys. Attempts to isolate an ornithosis agent from 283 embryos and poults derived from eggs collected during the acute phase of ornithosis in the parent flock were unsuccessful. About 10 per cent of the serums of 23-day embryos and 1-day-old poults from the same group contained passive antibodies as detected by the indirect complement-fixation test.—[*L. A. Page and R. A. Bankowski: Investigation of a Recent Ornithosis Epornitic in California Turkeys. Am. J. Vet. Res., 20, (Nov., 1959): 941-945.*]

Ornithosis Caused by Agents of Low Virulence

The first two outbreaks of ornithosis detected in California turkey flocks were characterized by the relative avirulence of the organisms and the mildness of the natural disease. No infections among persons handling the flocks on the premises or during processing were reported. Indirect complement-fixation (ICF) antibodies were detected in 8 per cent of the breeders of one of the flocks two months after the natural infection. Birds from the flock were immune to an intratracheal challenge dose of 44,300 mouse ID_{50} of the homologous agent 30 months later. Some immunogenic differences between the mild California strain (C-1) and the more virulent New Jersey strain of the agent were apparent in cross-immunity studies in turkeys and mice. Attempts to isolate an infectious agent or to demonstrate positive ornithosis serology in 100 poults hatched from eggs collected during the peak of an outbreak in the parent flock were unsuccessful.—[*R. A. Bankowski and L. A. Page: Studies of Two Epornitics of Ornithosis Caused by Agents of Low Virulence. Am. J. Vet. Res., 20, (Nov., 1959): 935-940.*]

Resistance of Sheep to Listeria

Resistance to Listeria encephalitis was demonstrated in 12 of 13 sheep vaccinated with live virulent organisms one to 27 months prior to an intracarotid challenge. This was in contrast to sheep vaccinated with either killed or live avirulent (for mice) organisms, wherein 6 of 8 died with acute Listeria encephalitis. Seven of 9 control sheep similarly died. Agglutinating antibody response was detected in the group vaccinated with live virulent organisms but was nil or meager in sheep vaccinated with killed and live avirulent organisms. These findings are discussed in relation to the questions of the mechanism of immunity in listeriosis and the prospects of developing practical means for immunizing ruminant animals.—[*J. W. Osebold, A. Njoku-Obi, and J. M. Abare: Acquired Resistance of Sheep to Listeria monocytogenes and Pilot Studies on Vaccination. Am. J. Vet. Res., 20, (Nov., 1959): 966-972.*]

New Books

Diseases of Poultry

This well-known treatise is now in its fourth edition and consists of 41 chapters written by 33 experts in their respective fields. The contents, with extensive bibliographies and an exhaustive index, make it an encyclopedia of poultry disease information. The book has gained an international reputation as one of the classics in veterinary literature. As in previous editions, the editors have made conscientious efforts to maintain this reputation. Seven new authors have been added to replace nine authors of the previous edition who because of various reasons, including death and retirement, have necessitated changes in allotments.

Examples of new subjects covered are "Infectious Synovitis" by Dr. N. O. Olson, West Virginia University, and "Vibrionic Hepatitis" by Dr. M. S. Hofstad, Iowa State University.

Another of the many important additions and revisions made to keep the book abreast of the times is the completely rewritten chapter on ornithosis by Dr. K. F. Meyer. A section on studies of the avian leukosis agent by electron micrography by Dr. Leon Dmochowski, M. D. Anderson Hospital and Tumor Institute of Houston, Texas, is a valuable addition to the chapter on Avian Leukosis.

A major change in format in the fourth edition is the use of a two-column page instead of a single-column page. This change has resulted in the reduction of size by 142 pages, in spite of a large amount of new information added by authors to bring their contributions up-to-date. The change in format has also made for easier handling and reading. A marked improvement in this edition is the placing of illustrations near the text reference.

The editors are to be commended for their untiring efforts to maintain the high standards of this treatise. [*Diseases of Poultry. 4th ed. Edited by H. E. Biester and L. H. Schwarte. 1103 pages. Iowa State Univ. Press, Ames, Iowa. 1959. Price $14.50.*]—W. R. HINSHAW.

Pathophysiology in Surgery

This book represents a comprehensive integration, effectively interspersed with clinical case reports, of the three subjects included in the title. The reader gains the impression that the author must be an inspired teacher with a desire to impart practical knowledge. The author's apparent vast experience in the field of surgery and his appreciation of the importance of fundamental principles produce a continuity of basic concepts throughout the book. The result is definitely superior to compilation editions written by many authors with differing philosophies and fundamental concepts. There are numerous illustrative

drawings and graphs, a choice number of references to the literature, and reports on the latest techniques and ventures in surgery, including homologous vessel grafts. He emphasizes strict attention to the application of fundamental principles, both during and following the surgical operation.

The description of wound healing does not seem to emphasize the variations in the time which depend upon the type of tissue involved. It is especially interesting that the healing of irradiated tissue is said to be impaired somewhat and that all references to the literature on radiation and radioactive isotopes concern their use in diagnosis or their application in treating malignancies. Chapter 9 gives a practical summary of the latest knowledge on enzymes and their use in diagnosis and treatment. With respect to chapter 11, which deals with acute liver failure, the only reference to hypoglycemia in animals pertains to experimental, complete extirpation of the liver of the dog. The reader may wonder why no reference is made to the vast amount of literature pertaining to acute clinical hypoglycemia and acetonemia or ketosis in cattle.

The book contains much valuable information for workers in surgery, teaching, and research. It should be valuable as a reference book but not as a text for veterinary students.—[*Pathophysiology in Surgery. By James D. Hardy. 704 pages; illustrated. Williams & Wilkins Co., Baltimore 12, Md. 1958. Price $19.00.*]—W. F. GUARD.

Reproduction in Domestic Animals

There are 12 contributing authors to this volume. The first nine chapters are devoted to mammalian reproduction and the last two to an excellent discussion of reproduction in the domestic fowl.

The text deals first with spermatogenesis, biochemistry of semen, and libido in the male. This is followed by a detailed account of artificial insemination, with the exception of the evaluation of the sperm. This all-important subject is much too brief. There are chapters on nutrition and reproduction, environmental factors other than nutrition, and anatomical and physiological factors affecting fertility.

The last chapter on mammalian reproduction is a brief account of infectious diseases influencing reproduction. This short treatise on diseases is of little value to the veterinarian but may serve as a warning to those research workers who have not had the advantages of a medical training.

"Reproduction in Domestic Animals" is indeed a very valuable contribution to our literature, summarizing and evaluating the vast amount of research which has been done in recent years.

Volume I was reviewed in the September, 1959, issue of the JOURNAL. (Vol. 135, No. 5, p. 288).—[*Reproduction in Domestic Animals. By H. H. Cole and P. T. Cupps. Vol. II. 451 pages; illustrated. Academic Press Inc., 111 Fifth Ave., New York 3, N.Y. 1959. Price $13.00.*]—G. W. McNUTT.

Law for the Veterinarian

Legal considerations for the veterinarian and animal owner, a subject of timely importance in today's complex society, is covered in all its common aspects in this one volume. Written by a professor of agricultural law and an attorney, in a clear and uncomplicated style especially for the lay reader, it should serve as a ready reference for most legal matters pertaining to animals and veterinarians.

Among the subjects that pertain specifically to veterinarians are regulation of the veterinary profession, contractual relations of veterinarian and client, negligence and malpractice, employees of veterinarians, veterinarian's responsibilities, federal, state, and local animal disease laws, food and feed laws, drug laws, dog laws, sales and warranties of animals, animal hospitals, partnerships, taxes and insurance, and real estate and leases.

It is completely and conveniently indexed, and cites 375 officially documented cases as the bases for the conclusions presented. It is not intended to serve as a substitute for professional legal help.—[*Law for the Veterinarian and Livestock Owner. By H. W. Hannah and D. F. Storm. 1st ed. 196 pages. Interstate Printers and Publishers, Inc., Danville, Ill. 1959. Price $6.00.*]

First Annual Association Secretaries Conference—Another Forward Step in Organized Veterinary Medicine

The first annual Constituent Association Secretaries Conference, sponsored by the AVMA, convened November 21 and 22, inaugurating an organized long-range program to improve communications between the National Association and its constituent organizations.

The two-day conference was held at the Congress Hotel, in Chicago, adjacent to the national headquarters to permit the conferees to tour the AVMA's working arena.

Thirty-nine states and provinces and the National Association of Federal Veterinarians were represented. In addition, the Association hosted five guests from the American Veterinary Exhibitors Association.

Keynoting the program, Dr. James R. Hay, AVMA director of professional relations, explained the purpose of the meeting. Said Dr. Hay, "We are here to explore ways to improve and assist organized veterinary medicine for the benefit of all veterinarians and the public we serve . . . to develop a closer working relationship between state, province, and AVMA."

The conference included several general areas of discussion: planning and management of a convention; exhibits in public relations; exhibits and exhibitors; program planning; AVMA state association relationships; publications; organization of state associations; and insurance.

Registration at the first Constituent Association Secretaries Conference November 21 and 22, in Chicago, totalled 60, representing 39 associations, the AVEA, AVMA group insurance consultants and administrators, and the AVMA headquarters staff. Dr. Hay, keynote speaker, appears at left.

Dr. A. P. Schneider, Idaho V.M.A. secretary, discussed programming of a four-state meeting series. Since the annual meetings of Idaho, Montana, Utah, and Wyoming are held consecutively, speakers are invited to plan a tour so they can participate conveniently at each. Said Dr. Schneider, "We set up this circuit tour; we get our speakers and invite them early, and plan either to start at one end of the circuit or the other. We have been doing this now for at least 12 years."

Mr. Russell G. Rongren, AVMA business manager, drew on his background of planning for seven national AVMA conventions, to tell how a meeting should be managed. Mr. Rongren stated, "There are no magic formulas or shortcuts to successful convention management. In a sense, it is like learning to play a musical instrument. You become proficient through practice. . . My philosophy on convention management is to allow time for the unexpected." Mr. Rongren cited two important requisites for conventional management: communications and taking nothing for granted.

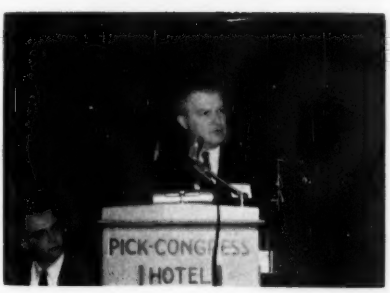
Dr. Frank Young, Iowa V.M.A. secretary, spoke about his 12 years' experience with business meetings in his association. The following comments were excerpted from Dr. Young's talk: "To keep away from the onus of dictation by the state association to the grass roots, we let each district elect their executive board member in any manner they wish. . . I feel the business of the association should be conducted by an executive board, or somebody outside of the general membership, because it is almost impossible to inform the general membership so that they can intelligently handle a subject during the short time at the annual meeting."

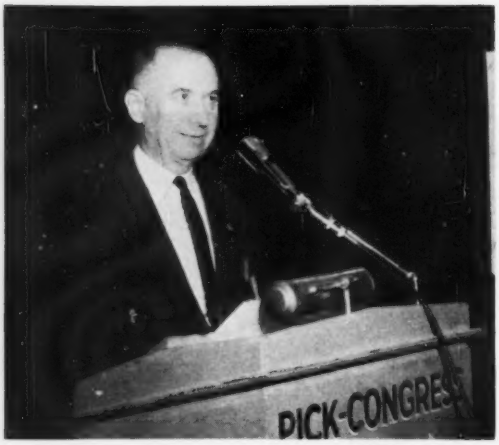
Dr. Raymond C. Snyder, Pennsylvania V.M.A. secretary, presented his views on program balance between large and small animal subjects: "As to the balancing of the program between large and small animal speakers, we have a two and one-half day program. That gives us five sessions. We do not have any sessions in the evenings. We figure on three speakers to a session, with 30-minute papers, and a 15-minute period for questions and answers. . . That gives us a total of 15 speakers for the two and one-half days."

▶ Public relations exhibits, one of which appears in the left background, were discussed by Mr. Brian Forster, AVMA director of public information. Display of approximately 50 association publications appears at right. Concerning publications, Dr. D. A. Price, editor-in-chief of AVMA publications, said, "Certainly, all of the publications should contain news items, reports of regular annual meetings, and short courses. . . If a publication grows large enough, you might consider inclusion of some scientific manuscripts."

▶ Dr. L. M. Borst, Indiana V.M.A. secretary, spoke on preparation and use of officers' kits to be used as guides for standard operating procedures by "officers, directors, and committee chairmen and members." In Indiana, a manual was compiled, which according to Dr. Borst, is another attempt . . . to interest more of our membership in association activities."

▶ Dr. O. H. Muth, Oregon V.M.A. secretary, discussed state legislation: "Effective state legislation depends on three principal things: public relations . . . good organization . . . finances." He added further, "Now, as to the working of legislative processes, we find the important thing is to have a lobbyist."





Dr. S. F. Scheidy, president of the AVMA, addressed the conferees at dinner, elaborating on the relationships of the 63 constituent associations and the AVMA. Dr. Scheidy commented, "These (constituent associations) are independent organizations. . . We want to keep them independent. . . We have learned over the years that so many members of constituent associations do not know what goes on in the AVMA and particularly the House of Delegates meeting, because they do not get a report. . . I want to compliment those delegates that now, in an informal way, have sent a written report back to the members. I think this is appreciated by a tremendous number of members back home who do not have a chance to sit in the House of Delegates meetings."

General J. A. McCallam, AVMA Washington representative, spoke on national legislation concerning veterinarians. Objectives of the AVMA regarding national legislation were cited by General McCallam: ". . . to keep the membership and the AVMA executive office informed of bills introduced in the Congress that affect or may affect the veterinary profession so that appropriate action may be taken . . . to maintain a file of legislative contacts in the central office and Washington office for purposes of liaison with Congress."

Mr. Kenneth Humphreys, California V.M.A. secretary, told how a house of delegates works in a state association. Basing his remarks on the program of the California association, Mr. Humphreys said, "This (House of Delegates), in our estimation . . . is the most important step that we have taken in state association affairs in many years. . . It is bringing back more new members, and more new members to the state association, than anything we have ever done. . . No longer do we hear that five or six men are running the state, or that members are not getting any benefits for their $30 dues."

Dr. Gail H. Gilbert, Colorado V.M.A. secretary, discussed committee operations. He said that in Colorado an elected Board of Control representing each district and the federal veterinarians, along with the elected association officers, administers the affairs of the association. Some of the committees discussed by Dr. Gilbert were public and professional relations, necrology, program, and legislative. He also mentioned periodical circulation of a newsletter restricted to association members to keep them up-to-date on association affairs.

Dr. Harry E. Kingman, Jr., executive secretary of the AVMA, addressed the Secretaries Conference at the closing luncheon. Dr. Kingman reiterated, "The AVMA is a federation of constituent associations. We take our lead from you, secretaries. We hope that you will not be backward about expressing your views. We hope that you will be open-minded to our suggestions." Seated at the speaker's table were (left to right)—Dr. John G. Hardenbergh, AVMA treasurer and consultant; Dr. S. F. Scheidy, AVMA president; Dr. C. B. Hostetler, Illinois V.M.A. secretary; and Dr. J. R. Hay, AVMA professional relations director.

Mr. Ed Mack, Jr., AVMA group insurance consultant, discussed the AVMA Group Insurance Plan. Mr. Mack stated that 4,200 veterinarians are now insured under this program and that gross premiums exceeded by 10 times, the original first year's estimates.

Three provincial association secretaries from Canada attended the conference. They are (left to right)—Dr. W. Turnbull, Saskatchewan; Dr. C. Kealey, Canadian V. M. A.; and Dr. H. L. Bryson, British Columbia.

General Young Retires as Army Veterinary Corps Chief

Brigadier General Elmer W. Young, VC, U.S. Army, retired as chief of the Army Veterinary Corps on Aug. 31, 1959. Upon retiring, he received the First Oak Leaf Cluster to the Legion of Merit. Brigadier General Russell McNellis succeeds him.

General Young has been chief of the Army Veterinary Corps since 1954 and has been in the Army Medical Service for 34 years. He is currently living in Arlington, Va.

U. S. Army Photo

Brigadier General Elmer W. Young

A native of East Carondelet, Ill., he received his D.V.M. degree from Kansas State University in 1925; the same year, he entered the Veterinary Corps as a second lieutenant.

In June, 1926, General Young was assistant post veterinarian at Fort Huachuca, Ariz. He then served in Washington, the Philippine Islands, and Virginia for the next 11 years.

General Young gave instructions in animal management and health to reserve cavalry officer units at Fort Riley, Kan., in 1937. He later served as veterinarian for the Indiana Military District and as officer in charge of veterinary food inspection in Indiana.

During World War II, General Young received the Legion of Merit for safeguarding the health of 3,000 pack animals used in the China-Burma-India campaign.

A part of the General's citation reads: "Much of the credit for the preservation of the military veterinary services belongs to General Young for his sterling and untiring efforts and tenacious faith in the usefulness of the veterinary service to the Armed Forces." He is also credited with expanding the use of Army veterinarians in research and development projects.

After leaving Burma in May, 1945, General Young went to Shanghai, China, where he helped set up a food supply system through which fresh food could be obtained locally for American troops, thereby eliminating a need for expensive air transport of food.

From 1949 to 1954, he was in the Quartermaster Inspection Service in Chicago, Ill., before being named chief of the Army Veterinary Corps.

During his Army Career, General Young graduated from the Army Veterinary School, Walter Reed Army Medical Center, Washington, D.C.; the Medical Field Service School, Carlisle Barracks, Pa.; and the Veterinary Radiological Health Course, Oak Ridge, Tenn.

Among his other awards are the Distinguished Service Award in Veterinary Medicine from Kansas State University's School of Veterinary Medicine and the Bronze Star with Oak Leaf Cluster.

Colonel McNellis Receives a Star, Heads Army Veterinary Corps

Colonel Russell McNellis, VC, U. S. Army, new chief of the Army Veterinary Corps, has recently been appointed to the rank of Brigadier General. General McNellis succeeds Brig. Gen. Elmer W. Young, who retired on Aug. 31, 1959, as head of the Army Veterinary Corps.

Brigadier General Russell McNellis

General McNellis also heads the Veterinary Division in the Army Surgeon General's office in Washington, D.C. He is the twelfth chief of the Veterinary Corps since its inception in 1916.

Born in Dunkerton, Iowa, in 1906, General McNellis graduated from Iowa State College in 1928. He also graduated from several Army schools and has served at various stations in the United States and overseas.

From 1942 to 1947, he was assistant chief of the U. S. Military Mission to Lima, Peru, where he helped with the organization of a Peruvian National Veterinary College and a Peruvian Remount Service (*see* the JOURNAL, Aug. 1, 1957: 161).

Fee-Basis Veterinarians to Receive Benefits

As a result of diligent work and close cooperation between AVMA officials and personnel of the Agricultural Research Service, fee-basis veterinarians who perform services in connection with the cooperative disease eradication programs will be eligible to receive benefits under the Federal Employees' Compensation Act.

According to the U. S. Department of Labor, the eligibility will have become effective on the date on which the veterinarian signed the agreement.

Veterinarians who hesitated to participate in the cooperative programs because of the uncertainty of federal compensation, in case of injury sustained in the performance of such duty, are thus assured of the eligibility to receive benefits.

Critical Languages

Financial incentives are now authorized to students interested in studying some of the many languages uncommonly taught in our colleges.

The National Defense Eradication Act of 1958 provides for the award of postbaccalaureate fellowships to persons meeting certain requirements. Of 86 languages listed as being critical, Arabic, Chinese, Hindi, Japanese, Portuguese, Russian, and Urdu are designated as having the highest priority.

Applications must be received no later than Feb. 15, 1960. The Language Fellowship Unit, Language Development Section, Financial Aid Branch, Division of Higher Education, U. S. Office of Education, Washington 25, D.C., can furnish particulars.

The student must be acceptable to the graduate school of an approved institution. The basic stipend will cover *(a)* the cost of tuition and all required fees; *(b)* $450 for summer (1960) study only; or *(c)* $2,250 for the 1960-1961 academic year. Special allowances will be provided for dependents and for travel in some cases.

Epidemiology Course for Veterinarians to Be Held in Atlanta

A one-week refresher course is being offered by the Public Health Service, Communicable Disease Center, Atlanta, Ga., Feb. 1-5, 1960.

Subjects to be covered will include: review of basic principles; fundamental statistical procedures; comparative medical research; vector-borne diseases; virus diseases of man and animal; epidemiology of diseases of laboratory animals; and essentials of epidemiological investigation.

There is no charge for the course. Enrollment is limited to 40 persons and applications will be accepted on the basis of date received and priority needs of the applicant.

Forms and additional information may be obtained by writing: Communicable Disease Center, Attention: Chief, Training Branch, Public Health Service, DHEW, 50 Seventh St., N.E., Atlanta 23, Ga.

Among the States and Provinces

District of Columbia

WASHINGTON, D.C.—LATE NOVEMBER.—Colonel Robert R. Miller, USAF, VC, chief of the Veterinary Service of the U. S. Air Force, was recently certified as a diplomate by the American Board of Veterinary Public Health.

Colonel Miller is a 1943 graduate of the Ohio State University College of Veterinary Medicine and a native of Boston, Mass.

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WASHINGTON, D.C., OCTOBER.—The fifth annual meeting of the District of Columbia V.M.A. was held on Oct. 13, 1959, in the Sternberg Auditorium at Walter Reed Army Institute of Research, Washington, D.C.

Highlights of the meeting included discussions on veterinary contributions to space flight, advances in bone and joint surgery on large animals, and present status of research in canine virus infections.

At the luncheon, Dr. Samuel F. Scheidy, president of the AVMA, reported on the XVIth International Veterinary Congress held in Madrid, Spain, last May, and the dedication of the new research institute in Israel.

Dr. E. E. Ruebush was appointed secretary-treasurer to replace Dr. Raymond Gochenour who moved to New Jersey.

Florida

MIAMI.—SHORT COURSES SCHEDULED.—Arrangements are being made for a short course in canine ophthalmology to be presented by Dr. William Magrane at the University of Miami, School of Medicine, with a tentative date set for Jan. 24, 1960.

Approximately 20 can be accommodated and the fee will be about $60 each for the four-day course.

In addition, tentative arrangements are also being made to schedule a course on radiology by Dr. Newton Tennille at the University of Miami, School of Medicine, for late February or early March, 1960. This also will be a four-day course which will accommodate 20 to 25 persons. The fee will be approximately $50 each.

Anyone interested in either of these short courses, should contact Dr. Robert Knowles, 2101 N.W. 25th Ave., Miami, Fla.—*Florida Vet. Bull., 9, (Sept., 1959): 20.*

Illinois

CHAMPAIGN, DECEMBER.—The winter dinner meeting of the Eastern Illinois V.M.A. was held Dec. 3, 1959, at the Hotel Tilden Hall in Champaign.

Colonel A. D'Amore, base surgeon at Chanute Air Force Base, spoke on "Veterinary Medicine in the Air Force Today."

Officers elected for 1960 were: Drs. W. L. Hay, Piper City, president; H. J. Heffernan, Danville, president-elect; and Ray Hatch, Urbana, secretary-treasurer.

Dr. R. K. Shideler, Danville, was reelected to a second term as representative to the State Association.

s/RAY HATCH, *Secretary.*

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URBANA, SHORT COURSE SCHEDULED FOR FEBRUARY.—The College of Veterinary Medicine at the University of Illinois will hold a short course for veterinarians and horse breeders on Feb. 4-5, 1960.

The meetings will be held in the auditorium of the veterinary medicine building on the University's campus.

Inquiries concerning this short course should be sent to: Short Course Supervisor, 116c Illini Hall, University of Illinois, Champaign, Ill.

s/L. E. BOLEY, *Chairman.*

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New Research Grant in Action

Dr. Kaeberle (left) is the recipient of the Illinois State V.M.A.'s graduate fellowship, the first of its kind to be established by a state veterinary medical association (see the JOURNAL, Sept. 15, 1959, p. 351).

Dr. A. K. Merriman (right), president of the Illinois State V.M.A., is pictured presenting the Association's check to Dr. Kaeberle. This fellowship pays up to $4,000 annually, including tuition.

Nebraska

LINCOLN, NOVEMBER.—The University of Nebraska Board of Regents recently authorized the title of Department of Veterinary Science to replace the previous title of *Department of Animal Pathology and Hygiene.*

The new title more logically includes the disciplines of biochemistry, parasitology, physiology, and virology, as well as bacteriology and pathology.

Another change includes a $120,000 physical plant remodeling program to provide additional research facilities for staff and graduate students.

The Public Health Service provided $58,000 for remodeling through a Health Research Facilities Grant; physical improvements totaling $80,000 had been made previously.

s/G. A. YOUNG, *Correspondent.*

Oklahoma

TULSA, NOVEMBER.—Dr. W. D. Speer, Jr. (TEX '46) of Tulsa has been selected secretary of the Oklahoma State V.M.A. to fill the vacancy created by the untimely death of Dr. W. F. Irwin (*see* the JOURNAL, Oct. 15, 1959, p. 447).

The Association will hold its next annual meeting February 1-2, in Oklahoma City.

South Dakota

RAPID CITY, SEPT. 17, 1959.—The Women's Auxiliary to the South Dakota V.M.A. met Sept. 17, 1959, at the Pretty Pines, Rapid City, for luncheon and annual meeting. Fifty members were present.

Mrs. D. L. Cotton, Beresford, reported on the AVMA Convention in Kansas City and the Auxiliary voted to contribute again to the AVMA Student Loan Fund and Research Fund.

Officers elected for the new year were: Mrs. W. G. Sessions, Redfield, president; Mrs. D. F. Rigo, Menno, vice-president; Mrs. H. K. Caley, Webster, secretary-treasurer.

Washington

RICHLAND, SEPTEMBER.—Newly elected officers of the Washington State V.M.A. elected at their annual meeting in the Desert Inn at Richland, Aug. 31-Sept. 1, 1959, are: Dean Ernest C. Stone, College of Veterinary Medicine, Washington State University, president; Dr. Robert L. Burch, Seattle president-elect; and Dr. Marlowe H. Jones, Tacoma, treasurer.

s/MR. ROBERT M. FORD, *Executive Secretary.*

Wisconsin

APPLETON, SEPTEMBER.—The fall meeting of the Northeastern Wisconsin V.M.A. was held at the Conway Hotel in Appleton on Sept. 16, 1959.

After the business session, Dr. Q. C. Metzig, Oshkosh, reported on feeder pig activities and on other matters presently before the executive board. Dr. W. J. O'Rourke, Madison, reported on the state office and Dr. A. Erdmann, Madison, discussed current tuberculosis problems within the state.

The following officers were selected: Drs. W. E. Norris, Valders, president; and Karl Hammerberg, New London, vice-president. —*Wisconsin V.M.A. Bull. (Oct., 1959): 3.*

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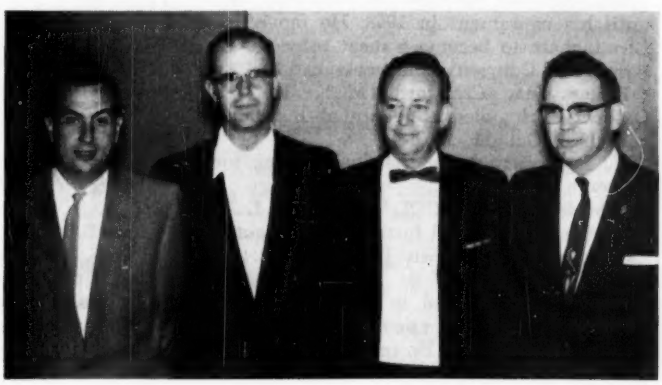
MIDDLETON, SEPTEMBER.—The September meeting of the Dane County V.M.A. was held at the Top Hat restaurant in Middleton on Sept. 10, 1959. Thirty-five members attended.

Among those on the program were Dr. E. A. Woelffer, Oconomowoc, who presented the highlights of the AVMA meeting in Kansas City, and Dr. R. D. Tetzlaff, Morrisonville, who reported on the executive board meetings. In addition, Dr. A. A. Erdmann, Madison, discussed the current



Pictured to the right are some of the members of the Washington State V.M.A.'s higher echelon.

Left to right—Drs. Robert L. Burch, president-elect; William F. Harris, past president; Ernest C. Stone, president; Marlowe H. Jones, treasurer.

budget problem and requested flies for identification during this period of high pink-eye incidence.

Dr. S. B. Hitchner, Madison, vice-president, was appointed program chairman for the remaining meetings. The Association also decided to hold all but the special meetings at the Top Hat restaurant in Middleton.—*Wisconsin V.M.A. Bull. (Oct., 1959): 4.*

State Board Examinations

TEXAS—Jan. 11-13, 1960, Austin. The completed application must be received in the Board office not later than 30 days before the examination date. Requests for information and applications should be sent to: Mr. T. D. Weaver, Executive Secretary, Texas State Board of Veterinary Medical Examiners, 207 Capital National Bank Building, Austin 16, Texas.

Deaths

Sylvester Brown (CVC '12), 81, Fullerton, Calif., died Oct. 6, 1959, at the home of his daughter Mrs. George Vandergrift, 1024 E. Union Ave., in Fullerton.

Dr. Brown practiced in Michigan and Nevada before moving his practice to California.

★**John Robert Christian** (CVC '16), 70, Birmingham, Ala., suffered a heart attack in Peoria, Ill., Nov. 12, 1959. Dr. and Mrs. Christian were in Peoria to attend a granddaughter's wedding at the time of his death.

Dr. Christian practiced in Woodhull, Ill., until his retirement in 1958. He moved to Birmingham to become a meat inspector at Armour & Company, six weeks ago.

Elmer Isaac Crawford (MCK '11), 77, Oxford, Mich., died suddenly at his cabin near Mio, Oct. 11, 1959.

He had practiced in the Oxford area for 40 years.

John Irvin Curtis (COL '16), 71, Salt Lake City, Utah, was killed instantly in an automobile collision in Salt Lake on Oct. 10, 1959.

Dr. Curtis practiced in Richfield for 23 years before he was appointed Utah State Veterinarian in 1938. He retired in 1957 and has since been a federal meat inspector.

John H. Darrow (UP '12), 72, Poughkeepsie, N. Y., died Oct. 4, 1959.

Dr. Darrow, a retired general practitioner, had been a member of the city's Board of Health for over 35 years.

George L. Fallon (CIN '10), 71, Baltimore, Md., died Nov. 13, 1959.

Dr. Fallon practiced in Cincinnati, Ohio, before moving to Baltimore twenty-two years ago. He retired as a federal veterinarian two years ago.

★**Henry Gerald Fehl** (ISC '41), 42, Sturgeon Bay, Wis., died suddenly of a heart attack, Oct. 20, 1959.

Dr. Fehl was past president of the Northeastern Wisconsin V.M.A. and quite active in many civic affairs.

★**Robert H. Folsom** (OSU '43), 44, Danville, Ky., died suddenly Oct. 21, 1959.

Dr. Folsom had been installed as president of the Kentucky V.M.A. the night before he died.

In Boyle County since 1946, Dr. Folsom was a veteran of World War II and discharged with the rank of captain. He was interested in breeding and rearing ponies and had shown several in national competition.

Venard S. Hadley (IND '16), 65, Mooresville, Ind., died after a long illness, Oct. 23, 1959.

★**Charles L. Haupert** (OSU '35), 47, New Philadelphia, Ohio, suffered a heart attack while making afternoon calls around Zoar, Ohio, on Oct. 9, 1959.

Dr. Haupert taught anatomy for one year at Ohio State University. He then served as district manager of Norden Laboratories for three years.

He began his practice in New Philadelphia in 1942. He was a member of Alpha Psi and Phi Beta.

Neal R. Jongewaard (ISC '09), 71, Sioux Center, Iowa, died three days after major surgery Sept. 24, 1959, in Rochester, Minn.

Dr. Jongewaard practiced in Sioux Center for 50 years and was a director of the Valley State Bank, in Rock Valley, Iowa, for 25 years.

James S. Kelly (ONT), 89, Tacoma, Wash., died Nov. 6, 1959.

At one time, Dr. Kelly held the chair of theory and a practice at the former Ohio Veterinary College for two years. He served as a meat inspector in various cities for the U.S.D.A. for 36 years.

★**Ernest Layne** (IND '04), 76, Huntington, W. Va., died Oct. 6, 1959. He had been retired from practice at the time of his death.

Born in Crown City, Ohio, Dr. Layne had been a resident of Huntington for the past 55 years. He was also a retired livestock dealer.

★W. Graham Love (UP '33), 50, New York City, N. Y., died on Nov. 15, 1959, as a result of cardiac involvement.

Born and raised in Yonkers, N. Y., Dr. Love practiced there for a time following graduation. He then was engaged in commercial biological laboratory work for several years before undertaking a research project at the University of Pennsylvania on the pathology and diseases of the equine eye in collaboration with Dr. E. L. Stubbs, the results of which work he published, as author or co-author, in the JOURNAL in the early 1940's. Later he was engaged in research at the USDA's Beltsville research station, then entered the Army Veterinary Corps from which he separated following World War II with the rank of captain.

Having decided, while in service, that he wanted to devote his life to church work, Dr. Love entered Union Theological Seminary and upon graduation was ordained a priest in the Episcopal Church.

He requested and was assigned to Missionary Service and was sent to a mission in Central America. There, he acquired tropical diseases which necessitated his return to the United States for treatment.

Following recuperation, he was assigned to a parish in New York's lower East Side. Although unable to have any active connection with veterinary medicine in recent years, Dr. Love maintained his interest in it.

Surviving is one sister, Mrs. Bertram H. Newton of Poughkeepsie, N. Y.

Milton Inman Lowrie (ONT '26), Charlotteville, P. E. I., Can., died Aug. 3, 1959.

Dr. Lowrie was with the Health of Animals Division, Department of Agriculture, and had been a secretary-treasurer of the Prince Edward Island Veterinary Association.

Charles F. McCarthy (USC '18), 67, North Brookfield, Mass., died after a short illness Oct. 19, 1959.

Dr. McCarthy began his practice in Brookfield, in 1923, and won national publicity when he was veterinarian for the Elm Hill Farm there; the farm which produced "Elsie," the famed Borden cow.

James Wayne McGinnis (KCV '09), 73, Ord, Neb., died Nov. 5, 1959, in a Lincoln hospital.

Dr. McGinnis practiced veterinary medicine for 50 years prior to his retirement 5 years ago.

Edward L. Metzger (OSU '01), 80, Canton, Ohio, died Oct. 24, 1959.

Dr. Metzger served in the Army Veterinary Corps in World War I and practiced in Canton and Louisville.

Raymond A. Moore (IND '17), 75, Frankfort, Ind., died of a coronary occlusion on Oct. 25, 1959.

He had been in ill health for a year.

★**Oskar S. Nordland** (ONT '33), 54, Kingston, Ont., Can., died suddenly at his home, Oct. 1, 1959.

Dr. Nordland was on the staff of the Defense Research Board Laboratory, in Kingston.

★**Bernard W. F. Repmann** (CVC '08), 72, Park Ridge, Ill., died Nov. 10, 1959, at Resurrection Hospital.

Dr. Repmann had been a general practitioner for 50 years.

Floyd A. Scott (ISC '11), 72, Austin, Minn., died at his home on Oct. 5, 1959.

Dr. Scott was employed as a Department of Agriculture meat inspector at George A. Hormel & Company for 45 years, before he retired in 1957.

Delver O. Turner (IND '13), 72, Clearwater, Fla., died from injuries sustained in an automobile accident Sept. 30, 1959.

Dr. Turner practiced in Franklin and Martinsville, Ind., before moving to Florida two years ago.

★**Herbert G. White** (IND '08), 71, Frankfort, Ind., died Oct. 26, 1959, at his home, after a short illness.

Upon graduation, Dr. White practiced in Kokomo until 1923; he then was employed by the State of Indiana.

He returned to private practice in Frankfort in 1928 and was one of the state's oldest active veterinarians at the time of his death.

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Other Deaths Reported.—The following deaths have been reported. Information for an obituary was not supplied.

Frank Hannah, 71, Eldorado, Ill., died Nov. 11, 1959.

Marion Husky, 78, Dallas, Texas, died Nov. 2, 1959.

Edward Veld (CVC '10), 71, South Holland, Ill., died Nov. 17, 1959.

Women's Auxiliary

Illinois

PEORIA, NOVEMBER.—The Women's Auxiliary to the Mississippi Valley V.M.A. met at the Hotel Pere Marquette, Peoria, Ill., Nov. 4-5, 1959. Sixty-six members were present.

Mrs. Paul Hendren, Carthage, presided at the business meeting. The following officers were elected for the ensuing year: Mrs. R. C. Williams, Moline, president; Mrs. William L. Beer, Aledo, president-elect; and Mrs. George Fehrenbacher, Wyoming, secretary-treasurer.

s/MRS. H. R. TEEGARDEN, *Correspondent.*

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MOUNT VERNON, NOVEMBER.—The Women's Auxiliary to the Southern Illinois V.M.A. met in Mt. Vernon, Nov. 5, 1959.

Mrs. R. D. Shilliday, then vice-president, presided at the business meeting. The Auxiliary voted to send $10 to the Loan Fund and $5 to the Research Fund. Mrs. C. H. Horstman, Collinsville, also gave a report on the AVMA's Convention held in Kansas City last August.

The following officers were elected for the coming year: Mrs. R. D. Shilliday, Waterloo, president; Mrs. Maurice Batson, Greenville, vice-president; and Mrs. L. H. Holt, Granite City, secretary-treasurer.

A white elephant sale was held for entertainment. Following the meeting, the Auxiliary members joined their husbands for dinner.

s/MRS. L. H. HOLT, *Secretary.*

Iowa

CEDAR RAPIDS, OCTOBER.—The 46th annual Eastern Iowa V.M.A. meeting was held October 15-16, at the Hotel Roosevelt in Cedar Rapids. Seventy-four wives were in attendance.

The luncheon program consisted of a lecture on professional beauty care. At the business meeting, $20.00 was presented to both the Women's Auxiliary Student Loan Fund and to the Research Fund.

Mrs. Glenn Rieke, Victor, state auxiliary president, addressed the conferees and Mrs. M. L. Worthington, Marengo, gave a report on the AVMA's National Convention.

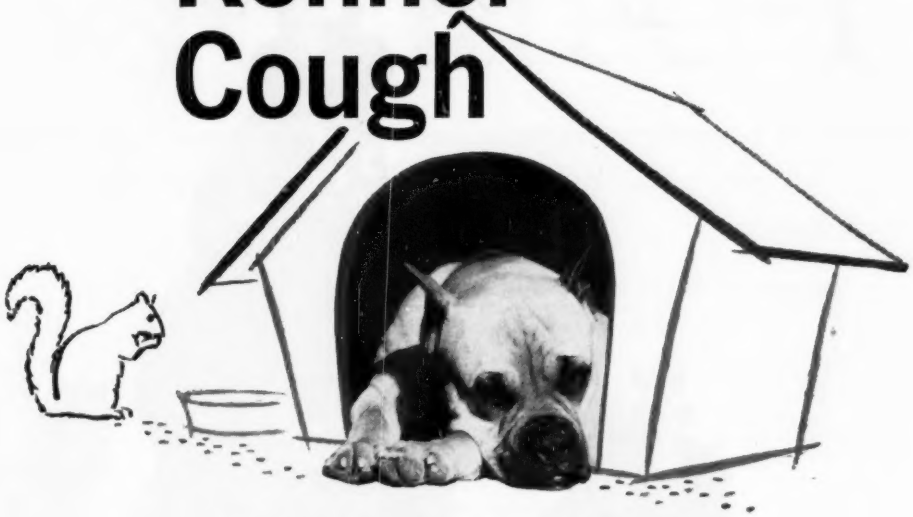
Newly elected officers for the coming year are: Mrs. Leroy H. Bell, Davenport, president; Mrs. K. H. Randolph, Lost Nation, president-elect; Mrs. Floyd Beaver, Grinnell, vice-president; Mrs. R. Elliott, Lone Tree, secretary; and Mrs. D. Bromwell, Center Point, treasurer.

s/MRS. R. ANTHONY, *Correspondent.*

Front row (left to right)—Mrs. A. J. McIntosh, past president; Mrs. G. Rieke, state auxiliary president; Mrs. Leroy H. Bell, president.

Second row (left to right)—Mrs. R. Elliott, secretary; Mrs. D. Bromwell, treasurer; Mrs. K. H. Randolph, president-elect; Mrs. Floyd Beaver, vice-president.

Kennel Cough



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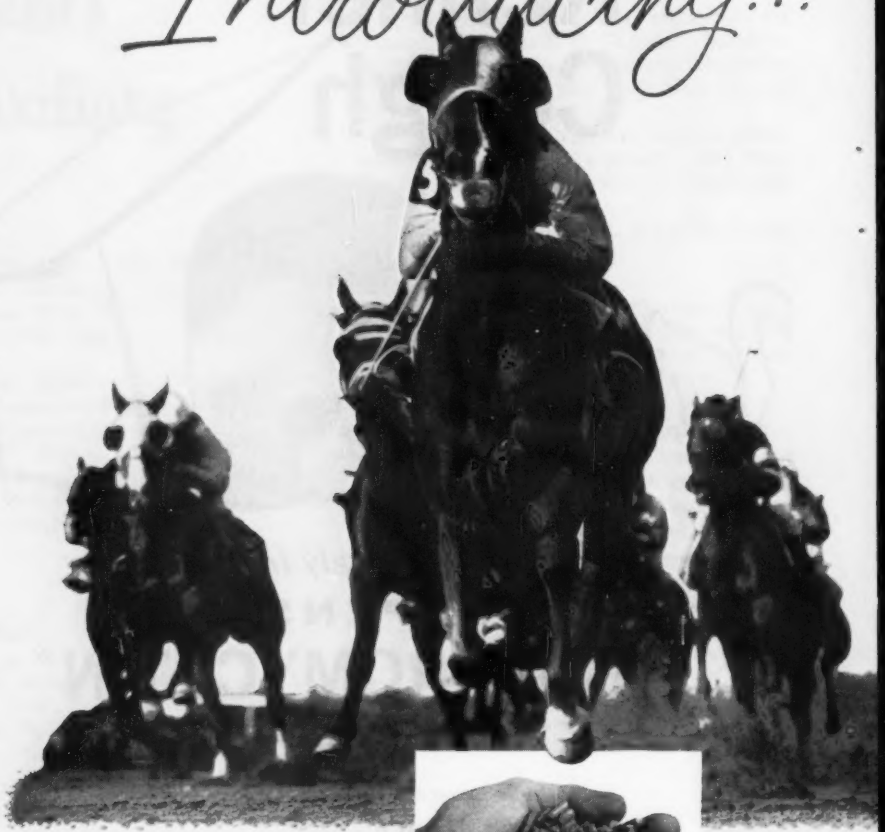

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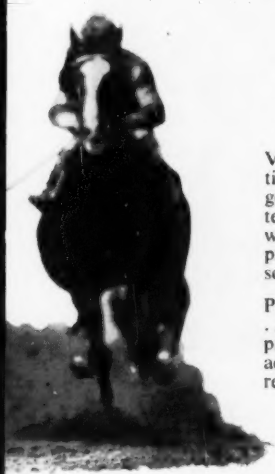

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Vitamin E	13.8 Int. units per oz. 222 Int. units per lb.
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Calcium	1814 mg. per oz. 6.4 per cent
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1. Osborne, J. C. *in* New Horizons in Chemotherapy. Proceedings of First Regional Conference on the Nitrofurans in Veterinary Medicine. In press.
2. Bull, W. S.: N. Amer. Vet. 38: 3 (Jan.) 1957.

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WHAT IS YOUR *Diagnosis?*

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Fig. 1—Dorsoventral radiograph of the right front foot.

History.—A male German Shepherd Dog, 1 year old, had been lame on the right front foot for several weeks. The dorsal metacarpal area was tender and swollen and during the past few days an abscess had developed and ruptured at the high point of the enlargement. The dog had not been injured except when he had encountered a porcupine about six months previously. At that time, numerous quills had to be removed from the front legs and muzzle. An anteroposterior radiograph (fig. 1) of the right front foot was taken.

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Osteomyelitis of the distal end of the fourth metacarpal bone.

Fig. 2—Dorsoventral radiograph of the left front foot of the dog. Notice the areas of necrosis and the new bone proliferation which fills the marrow cavity and raises the periosteum surrounding the bone (arrow).

Comment.—The swollen area and draining fistula over the bone lesion was explored and a porcupine quill was found impinging upon the periosteum of the fourth metacarpal bone. The quill is not radiopaque and did not show in the radiograph, but the areas of necrosis and new bone proliferation are evident (fig. 2). Products of this activity have filled the marrow cavity and raised the periosteum surrounding the bone. It does not appear that the periosteum is extensively damaged or ruptured. The quill was removed and drainage established, after which the dog received a long course of treatment with penicillin. Recovery was uncomplicated.—W. H. Riser, D.V.M., M.S.

This report was submitted by Dr. W. D. Carlson, D.V.M., Ph.D., radiologist, and the staff members of the Veterinary Clinics, School of Veterinary Medicine, Colorado State University, Fort Collins, Colo.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

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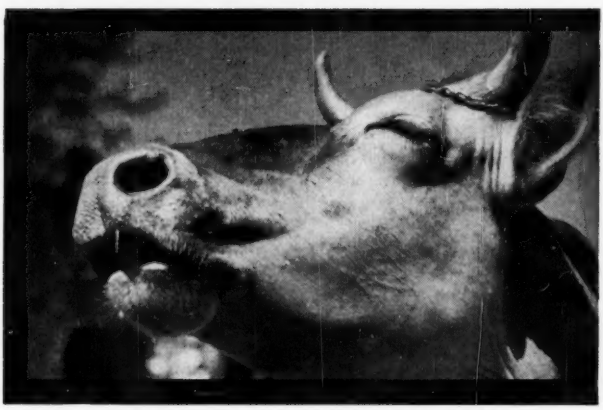

FUREA effectively combats the dangers that arise in bovine retained placenta by a 2-way action:
1) *bactericidal*, even in the presence of pus, blood and serum, and 2) *proteolytic* for resolving necrotic tissue.
Clinical usage produced a rapid decrease in signs of infection, reduction or elimination of malodor, and unimpaired fertility in over 90% of treated cows.
FUREA is an intrauterine bolus containing FURACIN® (brand of nitrofurazone) 0.12 Gm. and urea 12 Gm. The bolus disintegrates swiftly in uterine fluids, providing rapid and uniform distribution of active ingredients to the affected tissues. It is nonirritating and nontoxic.
Dosage: Two boluses inserted into the recently pregnant horn. One bolus may be placed in the nonpregnant horn. Repeat at 24-hour intervals, as necessary.
Supplied: Bottle of 25 boluses.

1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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prevention of uterine infection—early restoration of fertility in over 90% of treated cows[1]

Public Relations

BRIAN M. FORSTER, B.S.
DIRECTOR OF PUBLIC INFORMATION

COMPLETE BOY SCOUT PROGRAM FOR VETERINARY PUBLIC RELATIONS

Many veterinarians are active in some phase of the scouting programs in their communities. Some are troop leaders or scout masters while others participate as merit badge counselors or by permitting troops to tour their animal hospitals.

While these activities are valuable for improving public relations of the veterinary profession, the individual himself cannot ethically capitalize on his own community participation. Veterinary organizations, however, should not overlook the activities of their members in the Boy Scout organization.

Nationally, the American Veterinary Medical Association has rewritten copy for the Boy Scout merit badge manuals on animal industry, horsemanship, animal first aid and pet care. In the near future, we also hope to revise the manuals on poultry, swine raising, dairying, sheep raising and public health.

The Chicago Veterinary Medical Association is the only veterinary, medical, dental or pharmacal group sponsoring an Explorer Scout post—Veterinary Explorer Post 201, Winnetka, Ill. To help other veterinary organizations keep informed of scouting activities, an AVMA member serves as institutional representative to the post.

The boys of Post 201 are compiling reports on the seven major areas of veterinary activity and presenting the compilation to high school career counselors and librarians in their posts communities.

A future project is to have the boys contact the scout troops in their districts and encourage the younger boys to try for the merit badges of veterinary interest. Boys in their districts who earn a certain number of merit badges in these areas will receive the badges as gifts at an honor banquet given by veterinarians in their districts. While this program has not yet been attempted, it demonstrates the opportunity for local VMA's to improve public relations through participation in the scouting activities of their communities.

Tours through animal hospitals, films, slide talks, and live animal demonstrations are contributions that individual veterinarians can make to cub scouts, encouraging their participation in the veterinary activities of older scouts.

Newspapers are interested in photographs showing Boy Scout activities with veterinarians. They may even be interested in sending a reporter and photographer to cover the activity, but this will depend on the newspaper's policy.

Through such programs, no member outside the public relations committee is asked to increase the amount of time he spends on community affairs, but recognition for the profession is gained through publicity and the scouts have a broader concept of veterinary medicine. But most important, the community will realize that a veterinary organization exists.

Boys of Veterinary Explorer Post No. 201 visit with zoo veterinarian, Dr. Weaver Williamson of the Chicago Zoological Society, at Brookfield. Dr. Robert Storm, post advisor, arranged for the trip and accompanied the boys. Zoo attendant, Ed Nondra, holds the leopard while Dr. Williamson (kneeling) explains some of the animal's peculiarities.

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Scours, Fever, Post-Operative Care, Loss of Appetite

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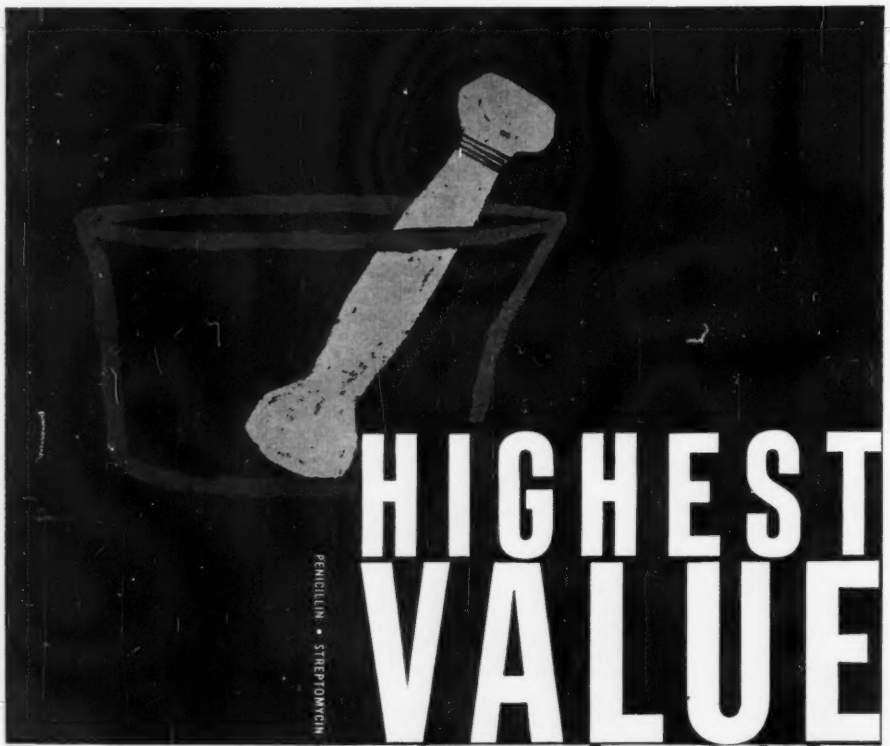

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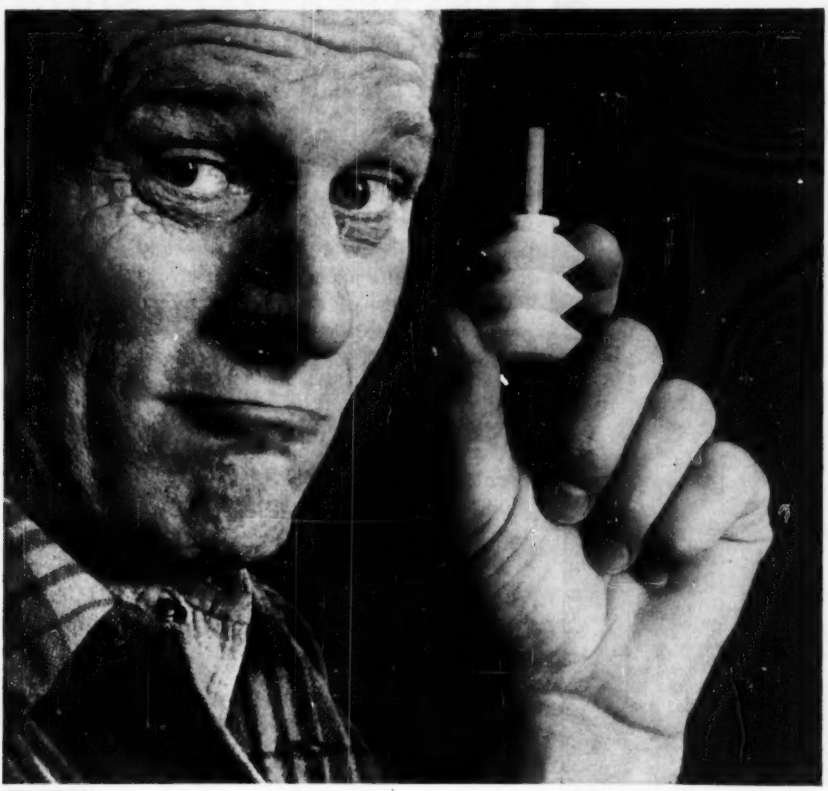

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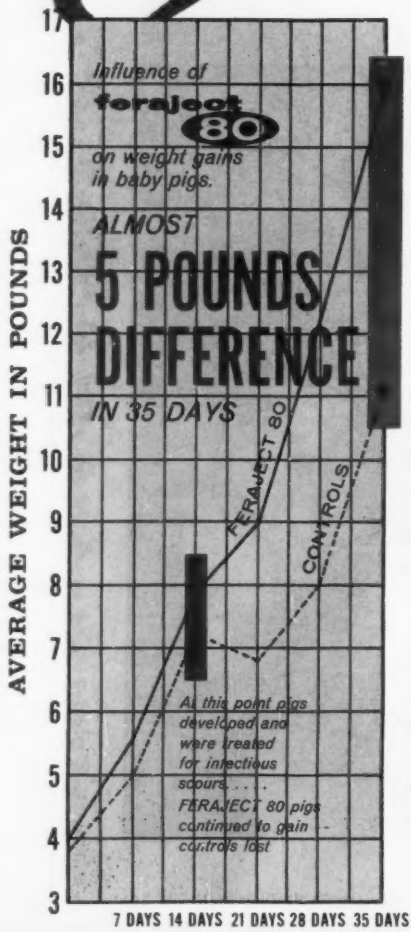

RESEARCH DATA SHOWS STEADY WEIGHT GAINS WITH FERAJECT 80

. . . even while pigs are scouring

In just a few days time over one month, pigs injected with Feraject 80 had an average gain of almost 5 pounds over control pigs. The weight of the control pigs dropped during a period in which both the controls and Feraject 80 test pigs developed infectious scours. On the other hand, the Feraject 80 pigs steadily gained weight even with the presence of scours.

What started out to be a routine weight comparison test developed into a weight gain test, under stress. It was not a test to prove Feraject 80 as a scour treatment because both the controls and Feraject 80 pigs were given identical treatment for scours when such treatment was indicated.

FERAJECT 80 AVAILABLE EXCLUSIVELY TO YOU

Feraject 80 is the only amylose complex injectable iron* containing 80 mgs. of iron per cc that is sold exclusively to veterinarians. Diamond makes Feraject 80 exclusively yours.

first in progress . . . through research

INJECTABLE IRON TO CONTAIN 80 mgs. OF IRON PER EACH C.C.

FERAJECT 80 OFFERS ADDED MARGIN OF SAFETY

At birth a baby pig possesses an insufficient supply (usually less than 100 mgs.) of iron. During the first 28 critical days of their life, they may acquire another 100 mgs. of iron through milk or other oral means if not on concrete. Iron requirements for this period are 300 mgs. This means pigs lack 100 mgs. or more of iron, which must be supplied through injections or other means.

Most iron injectables contain less than, or a maximum of, 100 mgs. of elemental iron per 2cc dose. For this reason Diamond research developed an injectable iron, Feraject 80, which offers an ADDED MARGIN OF SAFETY with an equivalent of 160 MGS. OF ELEMENTAL IRON per 2cc dose.

HIGH HEMOGLOBIN LEVEL . . . FASTER

The use of Feraject 80 increased the hemoglobin level . . . to a higher level and at a faster rate than all iron injectables tested. It aids in better disease resistance, feed utilization, and helps pigs reach market weight faster.

COMPARE THE LABELS

Don't be fooled by "ballooned" figures that lead you to believe there is more elemental iron in an injectable product than actually exists. Many labels show a high level of iron compounds, but they do not list the *elemental iron* equivalent, and are not complexed. Then there are those that are complexed and contain an equivalent of elemental iron, but they list the iron content per dose—not per cc. Check your injectable iron labels and then decide which one will do the best job for you.

COMPOSITION

Each 1cc contains the equivalent of 80 mgs. elemental iron as an amylose iron complex*with Vitamin B_{12} activity 2 mcgs. Cobalt (as chloride) 5 mcgs. Zinc 0.5 mg. (as the sulfate). Pyridoxine Hydrochloride (Vitamin B_6) 1 mg. and NEOJEL®*, in isotonic solution, preserved with Phenol 0.5%.

DOSAGE, ADMINISTRATION

For best results, Feraject 80 is to be administered intramuscularly in the ham. Prophylactic dose, 1 to 2cc. Therapeutic dose, 2cc. Minimum age for inoculation is three days.

*Patent Pending

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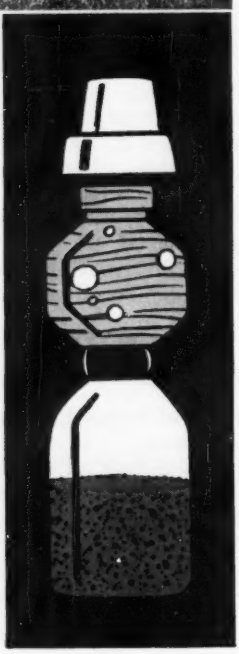

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VETERINARY DIVISION

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1877

The meetings for 1877 were again held in Boston and New York. A committee was appointed to petition Congress to enact more stringent laws for the prevention of disease from cattle imported from foreign countries. And in a paper on "Spinal Meningitis," A. A. Holcombe urged the necessity "for the elevation of the profession that our knowledge of the pathology of certain diseases should be improved . . . by careful and exact research."

It was resolved to publish the *American Veterinary Review* monthly, instead of semi-annually as first announced, and that the faculty of the American Veterinary College be added to the editorial staff. Dr. Liautard was given a free hand to spend "an amount of money for advertising said *Review*," and $5.00 was assessed per member to make up for unpaid dues and defaulted subscriptions to the *Review*.

Elected as the new slate of officers were C. P. Lyman, president (later founder and first dean of the veterinary school at Harvard University); Williamson Bryden, vice president; A. A. Holcombe, secretary; and Charles Burden, treasurer. Five new members were admitted, including John Meyer, Sr., who was destined to become the first 50-year member of the Association.

The Committee on Intelligence and Education was directed to initiate a convention of teachers from the various veterinary colleges in the country to discuss the improvement of veterinary science standards and the curriculum of the colleges.

In his address as retiring president, Dr. Liautard called attention "to the progress which veterinary medicine and surgery had made . . . [and] the birth of the *American Veterinary Review* was the most important [development] of them all . . . It was born to the Association upon the year of the hundredth anniversary of the birth of the nation . . . and is receiving favorable notice at the hands of English, French, and German veterinarians."

In retrospect, the significance of the *Review* confirms Liautard's opinion, for Merillat and Campbell state, "Its influence upon the trend and the development of veterinary medicine in this country for 30 years was not equalled by anything else . . . In fact, the *Review* very largely influenced the policies of the association and to a considerable extent, those of the schools also. The *American Veterinary Review* constitutes Doctor Liatuard's greatest contribution to veterinary medicine in the United States."

Certainly, for the first ten years or more, the *Review* was more representative of the American veterinary profession than any other institution, and its influence was largely responsible for the increasing leadership of the Association. Undoubtedly the previous lack of a public voice had been a major factor in the Association's failure to attract a larger membership and to exercise its full responsibilities to the profession. Also, the *Review* was not merely a repository for the history of the American veterinary profession — it created history by bringing to veterinarians in this country a new philosophy and new goals. In particular, Liautard's familiarity with developments in France resulted in his bringing to the American veterinarian an unfolding of the germ theory of disease—a matter which was being argued over in medical circles long after it apparently had been accepted by the veterinary profession.

VOL. 1. NO. 2.

AMERICAN
VETERINARY REVIEW.

A. LIAUTARD, M. D. V. S., Editor.

ASSISTED BY

A. LARGE, M. D. M. R. C. V. S. L., J. L. ROBERTSON, M. D. V. S. AND A. A. HOLCOMBE, D. V. S.

PUBLISHED BY THE

UNITED STATES
VETERINARY MEDICAL ASSOCIATION

APRIL, 1877.

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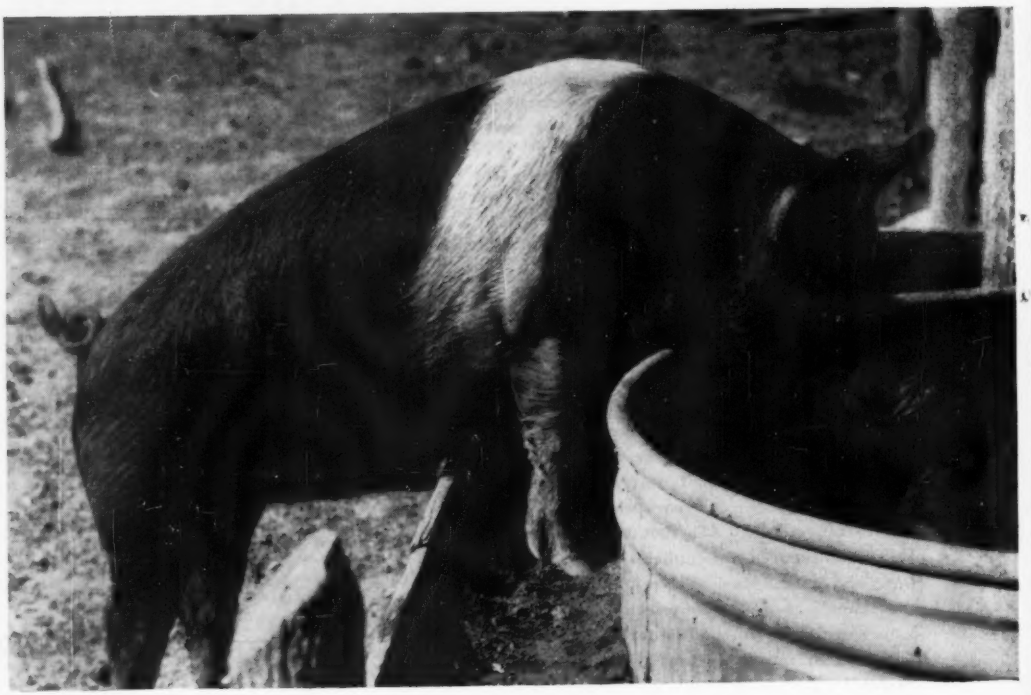

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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

New York State Veterinary College. Fifty-second annual conference for veterinarians. New York State Veterinary College, Cornell University, Ithaca, Jan. 6-8, 1960. George C. Poppensiek, dean.

Kansas Veterinary Medical Association. Fifty-sixth annual convention. Hotel Broadview, Wichita, Jan. 10-12, 1960. Melvin W. Osburn, 1525 Humboldt, Manhattan, Kan., secretary.

Arkansas Veterinary Medical Association. Annual meeting. Hotel Marion, Little Rock, Jan. 10-12, 1960. H. M. Goins, Berryville, Ark., secretary-treasurer.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Jan. 10-12, 1960. H. W. Hayes, 5009 Clinton Pike, Knoxville, Tenn., secretary.

Wisconsin Veterinary Medical Association. Winter meeting. Schroeder Hotel, Milwaukee, Jan. 10-12, 1960. W. J. O'Rourke, 1215 Vilas Ave., Madison 5, Wis., secretary.

Nevada State Veterinary Medical Association. Winter meeting. Riverside Hotel, Reno, Jan. 11-12, 1960. Brian L. Hutcherson, 2490 South Virginia St., Reno, Nev., secretary.

Indiana Veterinary Medical Association. Seventy-sixth annual convention. Hotel Severin, Indianapolis, Ind., Jan. 13-15, 1960. L. M. Borst, 3315 Shelby, Indianapolis, secretary.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Des Moines, Jan. 19-21, 1960. F. B. Young, Waukee, Iowa, secretary.

Michigan State University. Thirty-seventh annual postgraduate conference for veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Jan. 20-21, 1960. W. W. Armistead, dean.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Jan. 21-23, 1960. For information contact: Dr. Douglas H. McKelvie, 1220 South State St., Salt Lake City, Utah, or Dr. R. A. Bagley, 4600 Creek View Dr., Murray, Utah.

Mississippi State Veterinary Medical Association, Inc. Annual meeting. Hotel Heidleberg, Jackson, Miss., Jan. 23, 1960. Joseph W. Branson, P.O. Box 4223, Fondren Sta., Jackson, Miss., secretary-treasurer.

Minnesota State Veterinary Medical Society. Annual meeting. Hotel St. Paul, St. Paul, Minn., Jan. 25-27, 1960. B. S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn., secretary.

Louisiana State University. Twenty-ninth annual short course for veterinarians. Pleasant Hall, Louisiana State University campus, Baton Rouge, Jan. 26-27, 1960. R. B. Lank, Department of Veterinary Science, Louisiana State University, chairman.

North Carolina Veterinary-Nutrition Conference. Twenty-second annual veterinary conference in joint-session with the North Carolina Feed Industry. College Union, North Carolina State College, Raleigh, Jan. 27-28, 1960. E. G. Batte, chairman.

Ontario Veterinary Association. Annual convention and trade exhibit. Royal York Hotel, Toronto, Jan. 28-30, 1960. W. E. Jolliffe, Suite 102, 97 Eglinton Ave., East, Toronto 12, Ont., registrar.

Ohio State Veterinary Medical Association. Annual meeting. Deshler-Hilton Hotel, Columbus, Jan. 31-Feb. 3, 1960. R. E. Rebrassier, 1411 West Third Ave., Columbus 12, Ohio, executive secretary.

(Attention 1950 Ohio State University graduates.—A reunion of the Class of 1950 will be held in conjunction with the Ohio State V.M.A. meeting. Contact: the Reunion Committee, 36 Warden St., Springfield, Ohio).

Oklahoma Veterinary Medical Association. Forty-fifth annual meeting. Biltmore Hotel, Oklahoma City, Feb. 1-2, 1960. J. B. Corcoran, P.O. Box 652, Stillwater, Okla., president.

California Veterinary Medical Association. Midwinter conference. University of California, Davis, Feb. 1-3, 1960. Mr. Kenneth Humphreys, 3004 16th St., San Francisco 3, Calif., executive secretary.

Nebraska, University of. Conference on Swine Repopulation. University of Nebraska, College of Agriculture, Agricultural Experiment Station, Lincoln 3, Feb. 3-5, 1960. Inquiries should be directed to: Dr. E. Crosby Howe, Dept. of Animal Pathology and Hygiene, University of Nebraska, Lincoln 3.

American Animal Hospital Association, Region 2. Annual meeting. Robert Meyer Hotel, Jacksonville, Fla., Feb. 6-8, 1960. R. P. Knowles, 2101 N.W. 25th Ave., Miami 42, Fla., chairman.

Colorado State University. Twenty-first annual conference for veterinarians. Glover Veterinary Hospital, College of Veterinary Medicine, Colorado State University, Fort Collins, Feb. 15-17, 1960. O. R. Adams, program chairman.

Illinois State Veterinary Medical Association. Seventy-eighth annual convention. Abraham Lincoln Hotel, Springfield, Feb. 15-17, 1960. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., executive secretary.

Missouri Veterinary Medical Association. Sixty-eighth annual meeting. Hotel President, Kansas City, Mo., Feb. 21-23, 1960. Paul L. Spencer, P.O. Box 283, Jefferson City, Mo., secretary-treasurer.

Foreign Meetings

International Association of Veterinary Food Hygenists. Second Symposium. Basel, Switzerland, May 15-21, 1960. Dr. A. Clarenburg, 1, Sterrenbos, Utrecht, The Netherlands, president.

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

First International Congress of Endocrinology. Technical University of Denmark, Copenhagen, July 18-23, 1960. Dr. Christian Hamburger, Statens Seruminstitut, Copenhagen S, Denmark, chairman of the executive committee.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

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Dermatoses	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. For sustained therapy, repeat once or twice a week as indicated.
Inflammatory joint conditions	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. Supportive oral therapy not necessary.

*This initial injection may be reduced to 50 to 100 mg. intramuscularly if simultaneous administration of intravenous glucose is given, thus permitting more economical glucocorticoid therapy. If necessary, either regimen may be augmented by an additional injection of 50 to 100 mg. Ultracortenol after 24 to 48 hours. IMPORTANT: Milk from treated cows should be discarded or used for purposes other than human consumption for at least 24 hours after the last treatment.

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References: 1. Vigué, R. F.: J.A.V.M.A. 133:326 (Sept. 15) 1958. 2. Shaw, J. C.: Personal communication. 3. Pollock, S.: Vet. Med. 54:97 (Feb.) 1959. 4. Rabin, P. H.: Personal communication. 5. Hoffer, S. H.: Personal communication. 6. Weir, H. T., and Hazelrig, J. W.: Personal communication. 7. Beck, J. W.: Personal communication. 8. Bull, W. S.: Personal communication. 9. Fessenden, P. E.: Personal communication. 10. Lohmeyer, C.: Personal communication.

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Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. Cecil S. Yarbrough, 4121 U.S. 90 West, Mobile, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ALASKA—Anchorage Group of the Alaska V. M. A., the last Wednesday of each month at Fort Richardson Officers' Club or Thompson's Restaurant, 6th and I Streets, Anchorage, Alaska. Lt. Colonel E. H. Akins, Surgeon's Office, USARAL, Fort Richardson, Alaska, secretary to the Alaska V. M. A.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. John D. Clark, 518 West Oak St., Scottsdale, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tuscon, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. John S. Blackard, 420 Appian Way, Richmond, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. M. Lunstra, P. O. Box 734, Eureka, Calif., secretary-treasurer.

Kern County Veterinary Medical Association, the first Thursday evening of the month. Francis Dawson, 2007 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. George Crenshaw, 1137 8th St., Orland, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell in Modesto, Calif. Kenneth E. Erwin, Box 841, Manteca, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. M. C. McSpadden, 2372 West Ramsey, Banning, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of the month. R. M. Grandfield, 416 Stephens Rd., San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Vallejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Thursday of each month with the location specified monthly. Eugene C. Story, 4819 "V" St., Sacramento 17, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Barbara G. Shirley, Canoga Park, Calif., secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., secretary.

San Francisco Veterinarians, every other month—meetings decided at previous sessions. J. Wachs, 317D Sacramento St., San Francisco, Calif., secretary-treasurer.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month at the Tagus Ranch, Tulare. Larry A. Jackson, 12191 Lacey Blvd., Hanford, Calif., secretary-treasurer.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. E. J. Carroll, Dept. of Clinics and Surgery, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p.m. at the Tallahassee Dining Room, Tallahassee. C. Paul Vickers, P.O. Box 309, Talahassee, secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. Fred Jones, 3606 S. Dale Mabry, Tampa, Fla., secretary.

Hillsborough County Veterinary Medical Society, the second Monday evening of each month. For additional information as to the location of each meeting, contact: J. J. Metz, Jr., 5207 Nebraska Ave., Tampa 3, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month at the Green Turtle Restaurant, at 8:00 p. m. Edwin G. Clampett, 5150 Love Grove Rd., Jacksonville 7, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. John Webb, P.O. Box 183, Cantonment, Fla., secretary-treasurer.

Palm Beach Veterinary Society, the last Thursday evening of each month. McArthur Dairy Building, Four Points, W. Palm Beach. B. W. Bigger, 2833 S. 4th St., Fort Pierce, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwanee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary-treasurer.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Clare L. Bromley, 634 Northside Dr., N.W., Atlanta, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. J. A. Schmitz, 1711 Gwinnett St., Augusta, Ga., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

Southeast Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Paul B. Doby, 4 Owens Lane, Springfield, secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

INDIANA—Calumet Area Veterinary Medical Association, the first Thursday of each month. Bruce Sharp, Box 166, Hobart, Ind., secretary-treasurer.

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Central Indiana Veterinary Medical Association, the second Wednesday of each month. P. T. Parker, 224 N. Mill St., Plainfield, Ind., secretary-treasurer.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. Stanton Williamson, 217 W. Chippewa St., South Bend, Ind., secretary.

Northwestern Indiana Veterinary Medical Association, the fourth Thursday of each month, except August, January, and February. Harvey R. Smith, R.R. 2, Box 30. Lowell, Ind., secretary-treasurer.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, P.O. Box 183, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month except June, July, and August at 6:30 p.m., Breeze House, Ankeny, Iowa. S. L. Hendricks, secretary-treasurer.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Veterinary Medical Society, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. T. F. Bartley, P.O. Box 454, Cedar Rapids, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, P.O. Box 162, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, 202 S. Stone St., Creston, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

LOUISIANA—New Orleans Veterinary Medical Association, the third Thursday of every month at the Monte

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leone Hotel, New Orleans, at 8:30 p.m. Ronald C. Francis, 6421 Chef Menteur Highway, New Orleans, La., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Leonard D. Krinsky, 6111 Hartford Rd., Baltimore, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Jerry Fries, 2070 E. Main St., Owosso, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert W. Acton, 4110 Spring Rd., Jackson, Mich.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. Alvin R. Conquest, P.O. Box 514, Grand Blanc, Mich., secretary.

Southeastern Michigan Veterinary Medical Association, the fourth Wednesday of every month, September through May. Louis J. Rossoni, 24531 Princeton Ave., Dearborn 8, Mich., secretary.

MINNESOTA—Lake Region Veterinary Medical Association, quarterly meetings, with time and place specified prior to each meeting. J. A. Strache, Battle Lake, Minn., secretary-treasurer.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, R.D. 1, Box 284A, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. James R. Tanzola, Upper Saddle River, N.J., secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

South New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collmont Diner, Collingswood, N.J. Marvin Rothman, 718 Dwight Ave., Collingswood, N. J., secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, the third Wednesday of each month, Fez Club, Albuquerque. Donald W. Fitzgerald, 1825 Lomas Blvd., N.E., Albuquerque, N.M., secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. C. G. Sims, 2450 Battleground Ave., Greensboro, N. Car., secretary.

Eastern North Carolina Veterinary Medical Association, the last Tuesday evening of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary-treasurer.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant-Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the third Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. H. A. Justus, 924 Lakeside Dr., Hendersonville, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. W. H. Shartle, 323 S. Front St., Hamilton, Ohio, secretary.

Clark County Veterinary Medical Association, meetings held quarterly; time and place irregular. R. Edmondson, South Charleston, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, the third Thursday of every month, September through May; place irregular. R. W. Vesper, 1481 Doten Ave., Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April, and May, at 9:00 p.m., at the Carter Hotel, Cleveland, Ohio. R. W. Stockstill, 6545 Mayfield Rd., Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month; place irregular. William Pumpelly, 6801 Airway Rd., Dayton, Ohio, secretary-treasurer.

Fifth District Veterinary Medical Association, meetings held quarterly; time and place irregular. E. J. Kersting, 115 Sheffield Rd., Columbus, Ohio, secretary.

Geauga County Veterinary Medical Society, the third Wednesday of each month, at the Manor House, Newberry, Ohio, at 1:00 p.m. Peter J. Clemens, Jr., R. D. 2, Chagrin Falls, Ohio, secretary.

Kilbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginnig with February;

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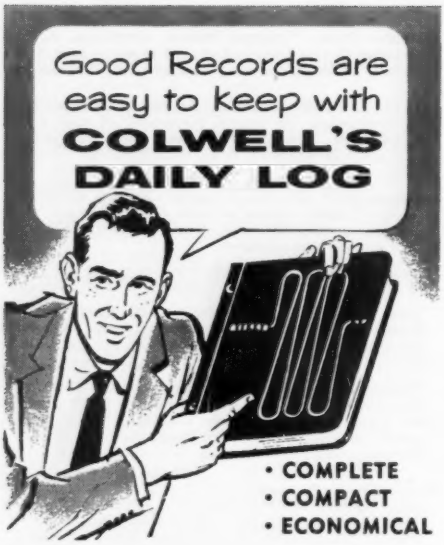

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place irregular. Charles Gale, Ohio Agricultural Experiment Station, Wooster, Ohio, secretary-treasurer.

Knox County Veterinary Medical Association, meetings irregular. F. O. Haberman, Centerburg, Ohio, president.

Lorain County Veterinary Medical Association the second Wednesday of April, June, October, December, and February; place irregular. G. W. Bunyan, 37200 Detroit Rd., Avon, Ohio, secretary-treasurer.

Madison County Veterinary Medical Association, quarterly; date and place irregular. James Herman, Mechanicsburg, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the fourth Tuesday of each month, at 9:00 p.m. Youngstown Maennerchor Club, Youngstown, Ohio. Robert Edwards, 25 Oriole Dr., Youngstown, Ohio.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September; place iregular. L. J. Grilliot, Route No. 1, Troy, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month, except during summer months; place irregular. Ben Henson, 268 S. Main St., Mansfield, Ohio, secretary-treasurer.

Northwestern, Ohio Veterinary Medical Association the last Wednesday of March and July; place irregular. F. C. Hartman, 3904 Rushland Ave., Toledo, Ohio, secretary-treasurer.

Southeastern Ohio Academy of Veterinary Medicine, every other month; time and place irregular. M. S. Phillips, Athens, Ohio, secretary.

Southern Ohio Veterinary Medical Association, meetings held quarterly at Wilmington; time irregular, S. E. Peterson, 1093 Rombach Ave., Wilmington, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBride's Emerald Lounge, Canton. Robert Leed, 5500 Cleveland Ave., N. W., North Canton, Ohio, secretary-treasurer.

Summit County Veterinary Medical Association, the last Tuesday of every month, excepting June, July, and August, at the Mayflower Hotel, Akron. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Toledo Veterinary Medical Association, every other month; date and place irregular. F. C. Hartman, 3904 Rushland Ave., Toledo, Ohio, corresponding secretary.

Trumbull County Veterinary Medical Association, meet three or four times a year; time and place irregular. R. A. Hanawalt, P.O. Box 117, Kinsman, Ohio, secretary-treasurer.

West Central Veterinary Medical Association, third Thursday of February, June, September, and November, at the Lima Club, Lima. K. R. Heidt, 1055 Spencerville Rd., Lima, Ohio, secretary-treasurer.

Wheeling Valley Veterinary Medical Association, meetings held quarterly; time and place irregular. Earl Weaver, 1406 S. Zane Rd., Martins Ferry, Ohio, vice-president.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, 1683 W. Bancroft St., Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge,

Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month at the City-County Health Building, 4616 E. 15th St., Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays. City-County Health Dept. R. H. Featherston, 3129 S. Winston, Tulsa 5, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. Jack E. Habluetzel, Route 1, Box 65-N, Ingleside, Texas, secretary.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

UTAH—Salt Lake Small Animal Hospital Association, the first Monday of every month, at the Holiday Inn, 3040 South State St., Salt Lake City, at 12:15 p.m. Douglas H. McKelvie, 1220 S. State St., Salt Lake City, Utah, secretary-treasurer.

VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p.m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

Northern Virginia Veterinary Conference Association, the second Tuesday of each month. T. P. Koudelka, P.O. Box 694, Harrisonburg, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.) C. R. Carlson, 1109 E. LaSalle Ave., Barron, Wis., secretary.

Coulee Region Veterinary Medical Association, the third Wednesday of every other month. F. N. Petersen, Box 127, Cashton, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. All but the special meetings will be held at the Top Hat Restaurant, Middleton. Robert E. Hall, 5718 Dogwood Place, Madison 5, Wis., secretary-treasurer.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. Raymond Pahle, 10827 W. Oklahoma Ave., Milwaukee, Wis.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. L. C. Allenstein, 209 S. Taft St., Whitewater, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. John B. Fleming, 209 E. 4th St., Marshfield, Wis., secretary.

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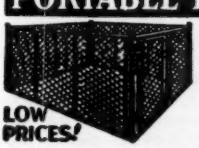

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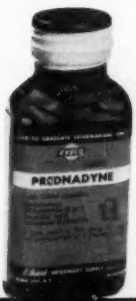

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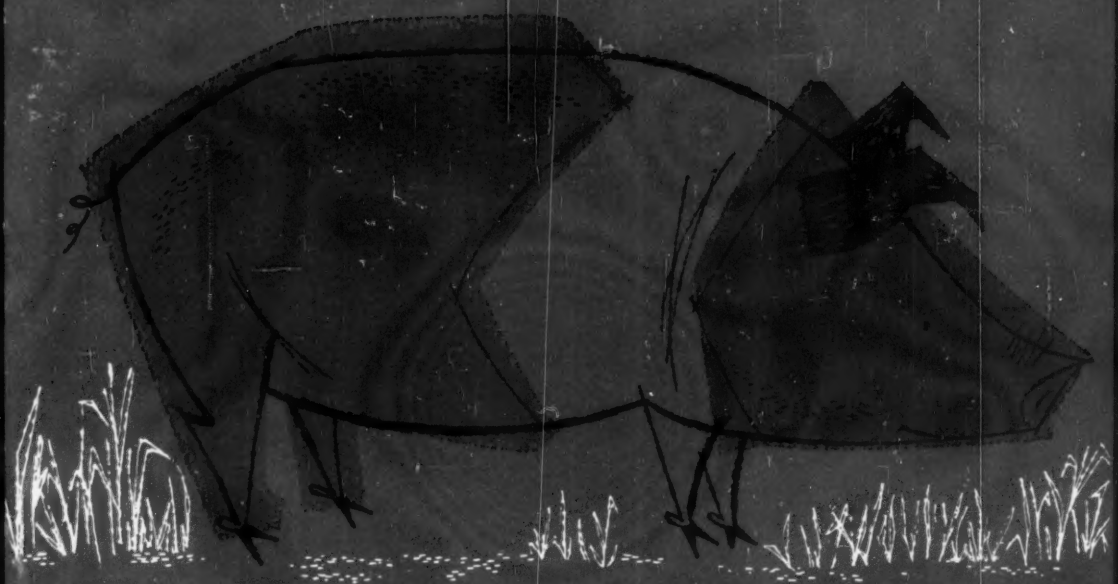

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